

MTNC040522A1

B19

Service Manual

HDTV MONITOR



PT-47X54J / PT-53TW54J

GN1P

This simplified service manual is issued to add listed model to the main service manual order No. MTNC040520C1(PT-53X54J). A parts list and schematics are included in this simplified service manual. Please file and use this simplified service manual together with the main service manual order No. MTNC040520C1(PT-53X54J).




WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Safety precautions

General guidelines

An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing. When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always replace protective devices, such as fuse paper, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.

Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. tag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.

The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. Do not use a line isolation transformer when testing.

Leakage current cold check

Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and expose metallic parts such as screwheads, antenna

terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k Ω and 5.2M Ω . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage current hot check

Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check.

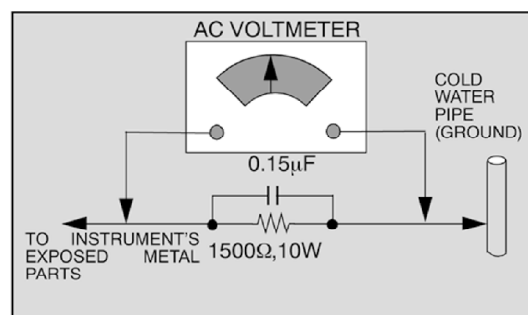
Connect a 1.5k Ω 10 watt resistor in parallel with a 0.15 μ F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts.

Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliampere. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and rechecked before it is returned to the customer.

Hot check circuit



Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/ 60Hz for 1 second. Confirm that the current measurement is 0.5mA ~ 2.0mA. Repeat test with other metallic exposed parts.

X-ray radiation

WARNING

The potential source of x-ray radiation in the PTV set is in the high voltage section and the picture tube.

NOTE

It is important to use an accurate, calibrated high voltage meter.

Apply all black video signals (1080i) and confirm high voltage measures 31.5 ± 1.0 kV. If the high voltage is not within the range, change C514 (in D-Board) to 1800pF, 2000pF, 2400pF or 2700pF until the desired value is obtained. Apply NTSC white pattern and confirm the high voltage

measures $30.1 \pm 1.5\text{kV}$. Apply HD 1080i white pattern and confirm the high voltage measures $30.1 \pm 1.5\text{kV}$.

2. About lead free solder (PbF)

NOTE

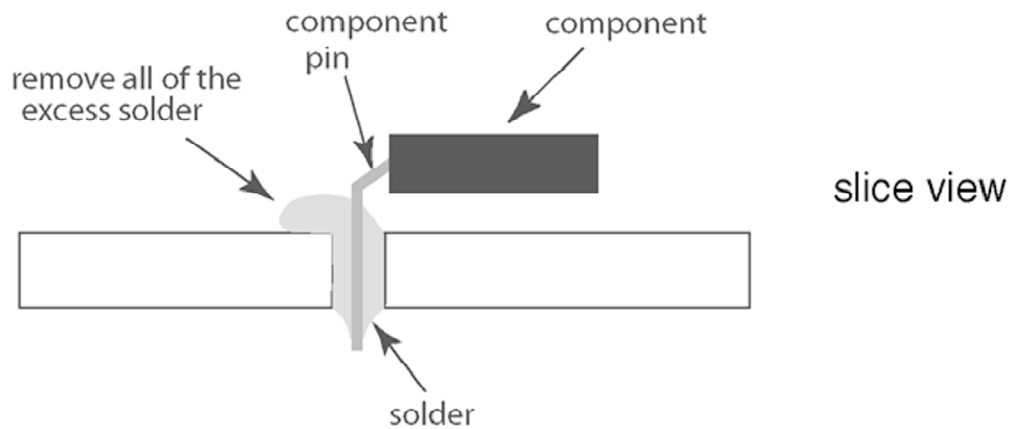
Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in its manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the "PbF" or a leaf symbol stamped on the / back of PCB.



CAUTION

- Pb free solder has a higher melting point than standard solder.
Typically the melting point is $50 \sim 70\text{ }^{\circ}\text{F}$ ($30 \sim 40\text{ }^{\circ}\text{C}$) higher. Please use a high temperature soldering iron and set it to $700 \pm 20\text{ }^{\circ}\text{F}$ ($370 \pm 10\text{ }^{\circ}\text{C}$).
- Pb free solder will tend to splash when heated too high (about $1100\text{ }^{\circ}\text{F}$ or $600\text{ }^{\circ}\text{C}$). / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side.



Suggested Pb free solder

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

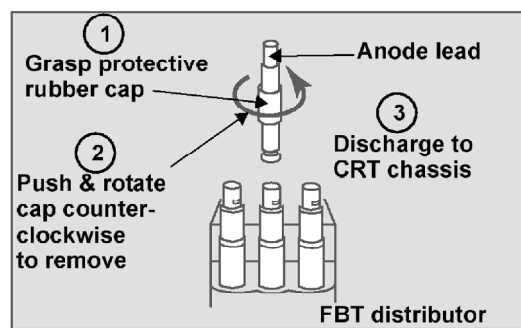
0.3mm X 100g	0.6mm X 100g	1.0mm X 100g

3. Important safety tests

Measuring H.V.

The anode caps are cemented to the CRTs. To gain access for high voltage measurement, remove the red CRT's anode lead from the flyback transformer distributor. Grasp the anode lead protective cap at its bottom and squeeze it against the locking cap body inside, rotate 1/4 turn counter clockwise and pull the anode lead sleeve out of the FBT distributor. Connect a high voltage positive lead from your H.V. meter to the FBT distributor, and the common negative lead to cold ground

FBT leads removal



Note:

Reinsert the anode lead into the FBT distributor until it is tightly and fully seated. Turn the locking cap clockwise to lock in place.

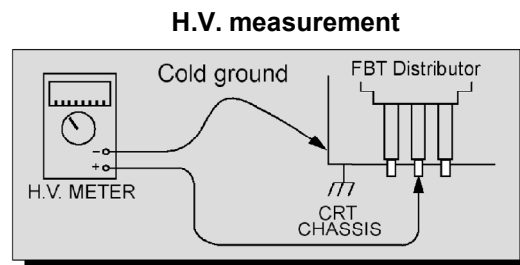
(EHT) Protector operation check

With the cabinet back removed, apply a nominal 120V A.C. to the PTV.

Over voltage test

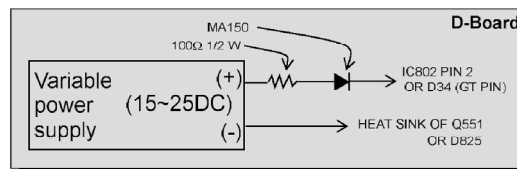
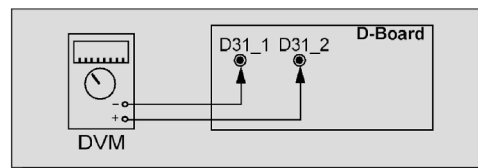
Preparation:

1. Turn PTV “OFF”
2. Connect a NTSC signal generator to the antenna terminal.
3. Connect DVM positive lead to D31 pin 2 and negative lead to D31 pin 1 on D-Board



4. Connect a H.V. meter (static type, class 0.1) with high voltage leads to high voltage distributor on FBT.

DVM and power supply connection



5. Connect the 15 ~ 25 V DC variable power supply positive lead to D34 or IC802 pin 2 (D Board) and negative lead to heat sink of Q551 or D825

Procedures:

1. Apply a NTSC white pattern.

2. Turn PTV ON.
3. Adjust the picture or brightness controls so that the DVM reads 12.7 ± 0.4 volts.
4. Increase the variable power supply until set turns off. The set should turn off at 12.7 ± 0.4 volts (DVM) and high voltage less than 36.4kV.
5. If the DVM reading is other than 12.7 ± 0.4 volts, readjust picture or brightness control and repeat steps 3.
6. Turn off the variable supply and confirm that the set will turn on by pulling out AC plug socket and connecting it again.

4. Service notes

NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chips capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6k Ω resistor, 0 = 0 Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

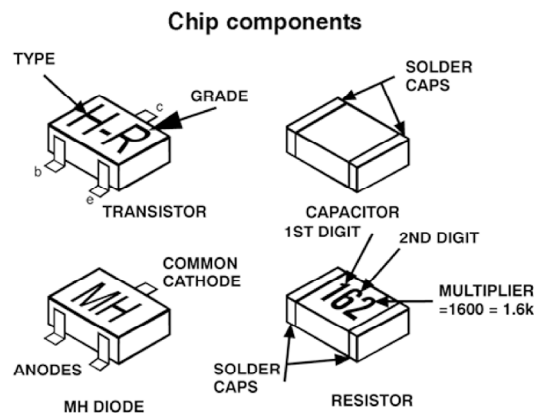
Component removal

1. Use solder wick to remove solder from component end caps or terminal.

2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

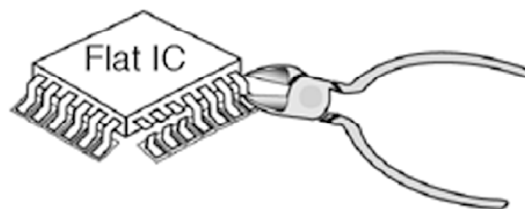
Chip component installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

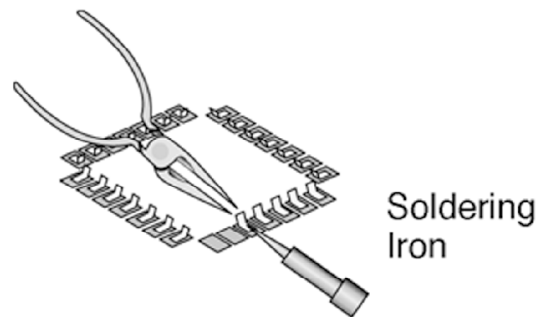


How to replace flat ic (required tools)

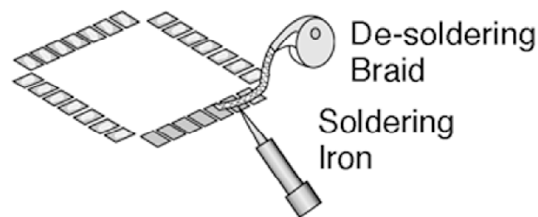
1. Remove the solder from all of the pins of a Flat IC by using a desolder braid



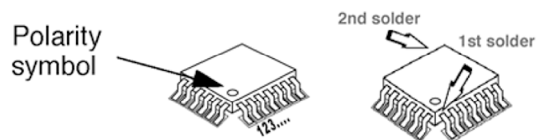
2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



3. Remove the solder from all the pads of the Flat IC by using a de solder braid



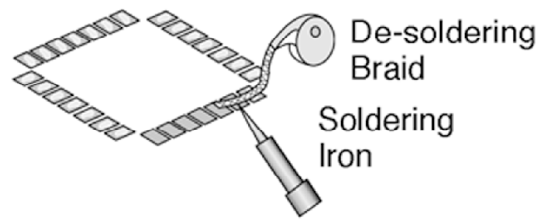
4. Position the new Flat IC in place (apply the pins of the Flat IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol



5. Solder all pins to the soldering pads using a fine tipped soldering iron



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below



IMPORTANT


To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires are securely connected

CAUTION

The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground(HOT or COLD) when servicing, or incorrect voltages will be measured.

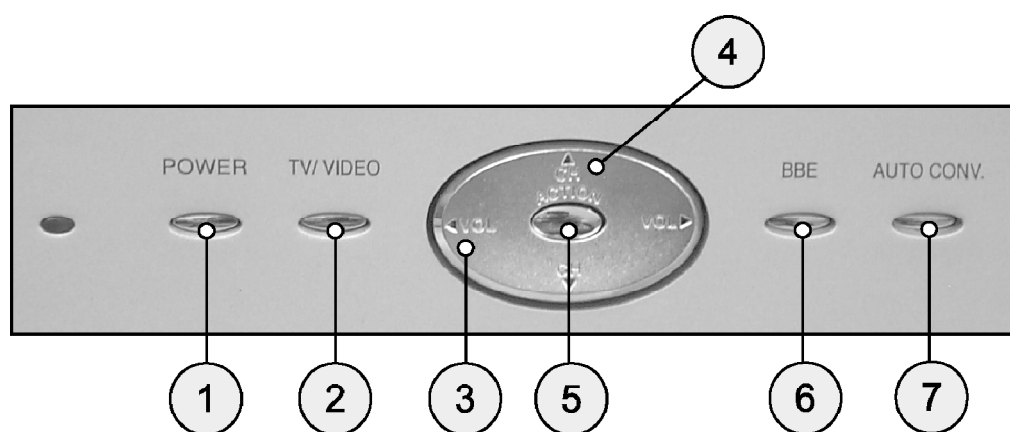
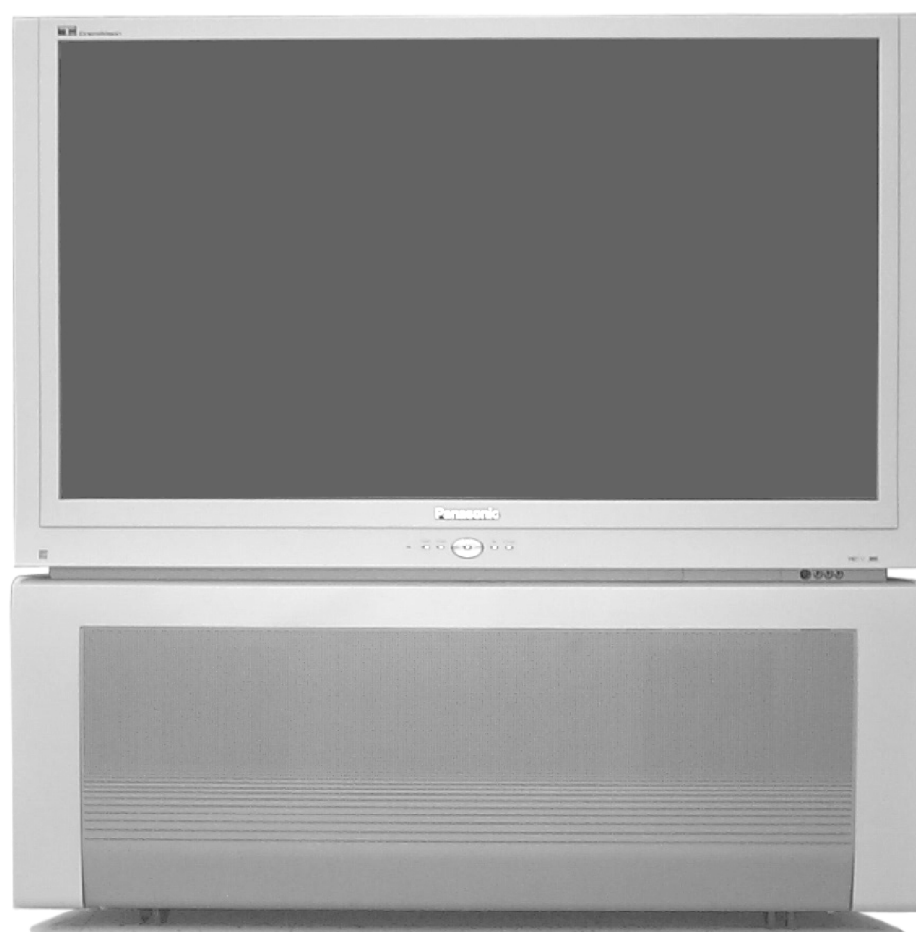
WARNING

This receiver has been designed to meet or exceed applicable safety and x-ray radiation protection as specified by government agencies and independent testing laboratories.

To maintain original product safety design standards relative to x-ray radiation and shock and fire hazard, parts indicated with the symbol  on the schematic must be replaced with identical parts. Order parts from the manufacturer's parts center using the parts numbers shown in this service manual, or provide the chassis number and the part reference number.

For optimum performance and reliability, all other parts should be replaced with components of identical specification.

5. PTV Location of controls



QUICK REFERENCE BUTTON OPERATION	
①	POWER - Press to turn ON or OFF.
②	TV/VIDEO - Press to select TV or one of the video inputs.
③	VOL - Press to adjust sound level, settings and features on menu.
④	CH - Press to select programmed channels. Press to highlight desired features when menus are displayed.
⑤	ACTION - Press to access menus.
⑥	BBE - Press to set BBE sound ON or OFF.
⑦	AUTO CONV. - Press to access the auto convergence process.

6. Receiver feature table

FEATURE/MODEL	PT-47X54J	PT-53TW54J
CHASSIS	AP832	BP832
MICRO	256K	
MENU LANGUAGE	ENGLISH / SPANISH / FRENCH	
CLOSED CAPTION	X	
V-CHIP (USA/CANADA)	X	
CHANNEL INFO BANNER	X	
VIDEO INPUT SKIP	SKIP	
CHANNEL COUNT	181	
PIP (1T), 2T PIP (2T), 2T SPLIT	2T SPLIT	
REMOTE CONTROL (W/LIGHT)	EUR7603ZF0	
CRT SUPPLIER	MDDA (CENTAUR IV)	
SCREEN	W/PROT SCREEN	ARS PROT SCREEN
CHASSIS	GN1P	
COMB FILTER	MOTION ADP, 3D Y/C	
HEC/VEC (X=BOTH)	X	
NEW YNR	X	
VM	X (SELECTABLE)	
V/A NORM (X=BOTH)	X	
COLOR TEMP	X	
AUTO CONVERGENCE	X	
AIP	X	
PRESET/INPUT LABELING	X	
VIDEO PICTURE MEMORY	X	
DIGITAL SCAN RATE	1080i, 540p	
NTSC LINE DOUBLER	540p PROGRESSIVE	
MTS/SAP/DBX	X	
BUILT-IN AUDIO POWER	15W x 2 (10%)	30W x 2 (10%)
No. OF SPEAKERS	4	6

FEATURE/MODEL	PT-47X54J	PT-53TW54J
BASS/BALANCE/TREBLE CONTROL	X	
AI SOUND	X	
SURROUND	X	
SPATIALIZER/BBE	BBE	BBE/VIVA
A/V IN (REAR/FRONT)	4(3/1)	
A/V PROGRAM OUT	X	
AUDIO OUT (FAO: F, VAO:V)	F,V	
COMPONENT INPUT (Y, Pb, Pr)	2	
S-VIDEO INPUT (REAR/FRONT)	2/1	
HDMI/HDPCP INPUT	X	

Note:

Specifications are subject to change without notice or obligation.

7. Board description table

Board Description for PT-47X54J models.

BOARD	PART NUMBER	DESCRIPTION
A-BOARD	TNP2AH058	MAIN CHASSIS
D-BOARD	TNP2AH059	POWER SUPPLY
CD-BOARD	TNP2AA166	AUTO CONVERGENCE SENSOR
* DC-BOARD	TNP2AA163	CONVERGENCE PROCESSING
* DG-BOARD	TNP2AA173AE	MPU, VIDEO SIGNAL PROCESSING
G-BOARD	TNP2AA164	FRONT A/V INPUT
H-BOARD	TNP2AA174AD	REAR A/V INPUTS
K-BOARD	TNP2AA165	KEYBOARD PANEL
LB-BOARD	TNP2AA161	BLUE PRT
LG-BOARD	TNP2AA160	GREEN PRT
LR-BOARD	TNP2AA162	RED PRT
R-BOARD	TNPA0615AB	IR SENSOR

Board Description for PT-53TW54J models.

BOARD	PART NUMBER	DESCRIPTION
A-BOARD	TNP2AH058AC	MAIN CHASSIS
D-BOARD	TNP2AH059	POWER SUPPLY
CD-BOARD	TNP2AA166	AUTO CONVERGENCE SENSOR
* DC-BOARD	TNP2AA163	CONVERGENCE PROCESSING
* DG-BOARD	TNP2AA173AE	MPU, VIDEO SIGNAL PROCESSING
G-BOARD	TNP2AA158	FRONT A/V INPUT
H-BOARD	TNP2AA174AF	REAR A/V INPUTS
K-BOARD	TNP2AA159	KEYBOARD PANEL
LB-BOARD	TNP2AA161	BLUE PRT
LG-BOARD	TNP2AA160	GREEN PRT
LR-BOARD	TNP2AA162	RED PRT
R-BOARD	TNPA0615AB	IR SENSOR

NOTE

When ordering a replacement board assembly, append an “S” to the board number

EXAMPLE

To order D-Board, the replacement board is TNP2AH059S

*

DC-Board and DG-Board are non-serviceable boards, except for the connector JK5001 in DG-Board. If any of these boards are defective, replace it with a new one.

8. Auto diagnosis feature

These receivers incorporate a self diagnosis feature. With this feature it will be easier for the technician to detect failures. There is a LED located by the keyboard on the front panel, this LED will start flashing when SOS is detected by the circuits located in specific areas, depending on how many times the LED is flashing, this will indicate what circuit should be checked. Make a count of flashing and see the table shown below. Please use this feature effectively especially for intermittent problems.

# OF FLASHES	POSSIBLE CAUSE
1	140V OVER VOLTAGE / OVER CURRENT OR VERTICAL
2	LOW DC
3	CONVERGENCE
4	SUB9V
5	HHS
6	IC4001
7	IC4201
8	IC4401

Note:

Flash only indicate a hint on a possible circuit failure and must not be used as a specific component diagnostic, (i.e. for IC4001 all related circuitry must be checked).

8.1. SOS History Check

When a certain SOS event is triggered by a malfunction on the receiver, the MPU stores on EEPROM the last SOS events occurred.

To check SOS history, self check procedure must be performed by pressing ACTION and POWER buttons on the receiver's keypad (3 seconds). The self check display appears showing the SOS sign with the last shutdown malfunction event(s) occurred.

Note:

If two or more SOS events caused the receiver's shutdown, all of the shutdown event will be shown at the time of displaying self check screen.

IMPORTANT:

At this moment the SOS history is cleared from EEPROM, so if self check is performed again the SOS number events won't be displayed on-screen unless SOS is triggered again.

Self Check screen.

SELF CHECK		NCO.1.000.000.0			
MEMRY	TNR1	TNR2	SOUND		
MTS	AVSW1	AVSW2	CONVR		
	GC3FM	GC3FS	GC3I		
HDMI					
AUCNV	1.000				
SOS	1	2	3	4	5
	6	7	8		
ROM CORR.	CHECK	SUM:	-	-	
Copyright 2004 Matsushita					
Electric Industrial Co., Ltd					

9. EEPROM copy jig

This PTV has a feature that allows to clone convergence from main EEPROM data adjustments from a PTV to other by connecting a jig to the PTV set, or can be used to back-up data before making adjustments. A jig part number TXFJIG01SER, is available through Matsushita/Panasonic Services.

Preparation:

To connect this jig, remove the lower back cover as instructed on disassembly for service section on this service manual and insert the jig into A15 connector located on A-Board. (See figure).

Procedure to copy data:

1. Enter to service mode and display service menu (see service

mode section).

2. Select “AREA” DAC and then press ACTION button on remote to enter. Press VOL right/left to select one of the following options then press ACTION:
 - Select ALL to copy all main EEPROM data
 - Select ADJ to copy only adjustment data.
 - Select FIX to copy only fix data
3. To copy data from main EEPROM to jig, select “IN → EX” DAC and press ACTION button on remote. The register background will momentarily become yellow indicating that copy is in progress.
4. To copy data from jig to main EEPROM, select “EX → IN” DAC and press ACTION button on remote. The register background will momentarily become yellow indicating that copy is in progress.

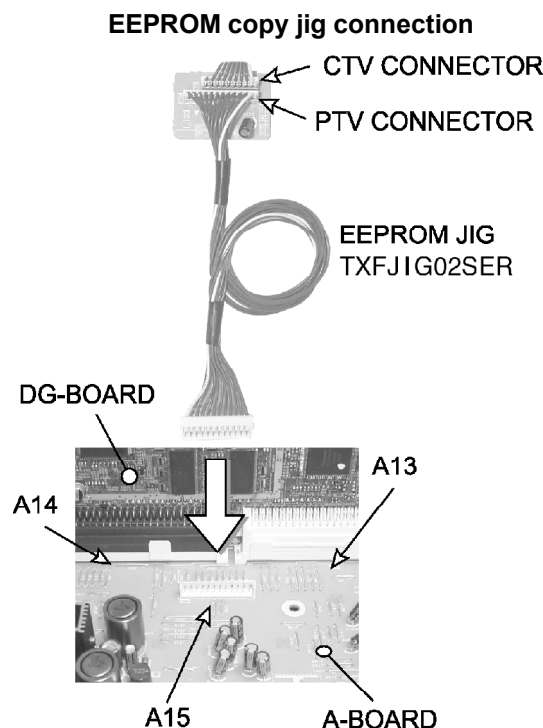
Procedure to copy convergence:

1. Enter to service mode and display service menu
2. Select “FINE” DAC and press ACTION on remote.
3. Press “8” on remote.
4. Select from and then press ACTION on remote:
 - INT to copy data from internal EEPROM to jig
 - EXT to copy from jig to internal EEPROM.
5. Select an option from the menu with CH keys and confirm with ACTION:
 - DEFAULT: default factory preset
 - CURRENT: to copy the current (receiver data or jig data) convergence adjustments to memory.
 - NOT USE: to back up data.
 - ALL: to copy all data.

NOTE:

The stated as default factory preset contain the factory DATA; Use this option when data was lost or when adjustment is lost completely.

6. Select destination to copy (INT or EXT) and confirm with ACTION.
7. Once an option is selected the copy process begins.
8. To exit "FINE" register press POWER and select "YES" option with ACTION. When the AUTO OFFSET process end, shut off the receiver.
9. Remove the copy jig from A15.



10. Disassembly for service PT-47X54J models.

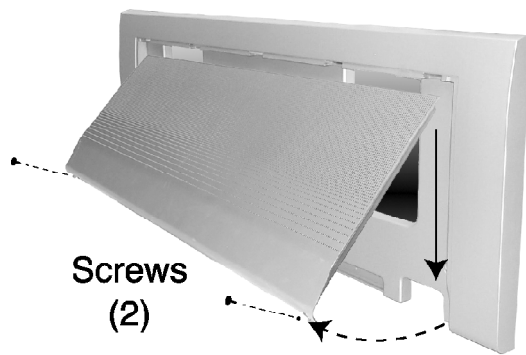
NOTE:

Board ground wires may have to be disconnected to disassemble some boards. All ground wires must be reconnected using jumper leads, if necessary, before power is applied to PTV for service.

Speaker grille removal

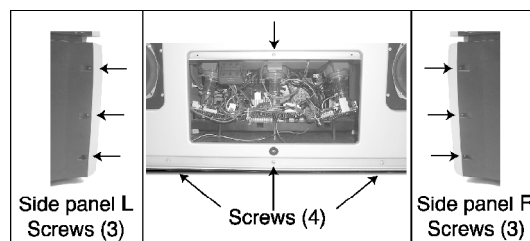
Speaker grille, is secured to the cabinet of the PTV with 1 velcro dot and 2 screws at the bottom. Take the screws out and grip panel from the bottom, pull slightly backward and at the same time pull down to uncouple the 4 tabs. When reassembling, make certain to firmly press on the panel where the velcro dot is and that the four tabs are properly inserted in the front cover.

Speaker grill removal



Front cover replacement

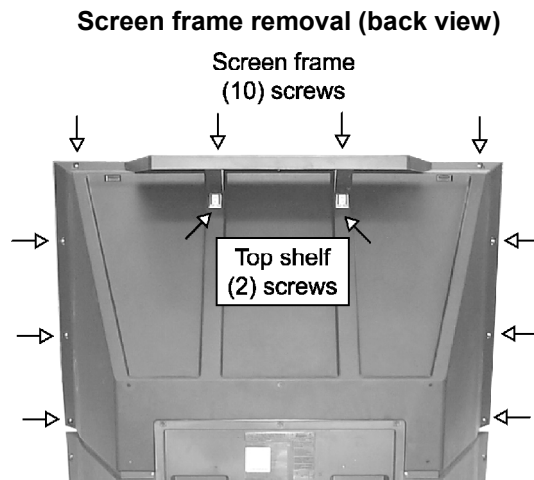
1. Remove the speaker grille.
2. Remove the cabinet front board by removing the 2 screws in the middle section.
3. Remove the screws from the middle section (4) of the front panel and both side panels (3 in each side from the back, see picture).



4. Pull the front panel from the bottom slightly downwards to unlock the tabs and remove.

Screen frame removal

1. First, remove the front panel.
2. Below the screen, remove the 5 screws from the tabs, just below the front A/V inputs.
3. Remove the 10 screws from the back cover. At this point the top shelf must be removed from the back cover (2 screws). Be careful when removing the screen frame, try removing the screws from the sides first and leave the top screws at last, be sure to hold the frame when removing the last screws.



4. Tilt the assembly forward while lifting it out of place.

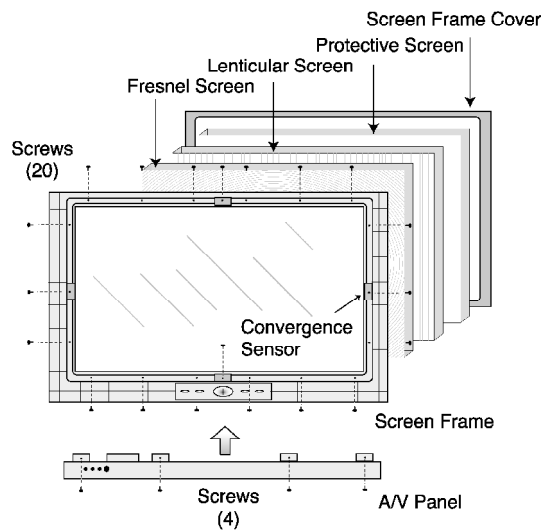
CAUTION:

At this point the keyboard, A/V inputs and convergence sensors, must be disconnected from K-board and G-board, otherwise the cables and connectors could get damaged.

Screen assembly

1. Remove the screen frame. See screen frame removal procedure above.
2. Place screen frame face down on a soft surface.
3. If necessary remove G-board and/or K-board.
4. If necessary disassemble A/V panel removing the screws (4) and tilt the panel upwards and release it from screen frame.
5. Remove the screws from the screen frame (20), be careful not to damage the convergence sensors (see picture).

Screen assembly (Inside view)



- 6. Carefully lift screen frame leaving the screen frame cover with the 3 screens (Fresnel, Lenticular, Protective) on top of it.**

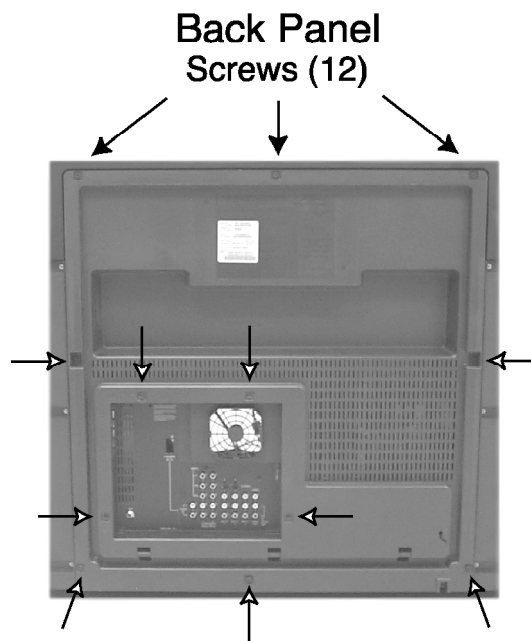
Keyboard and front A/V inputs removal

- 1. Unplug the connectors from keyboard and front A/V inputs assemblies. Remove the screws affixing the keyboard (4 screws) and front A/V inputs (3 screws) and tilt the A/V panel assembly upward and release it from the screen frame.**

Back panel removal

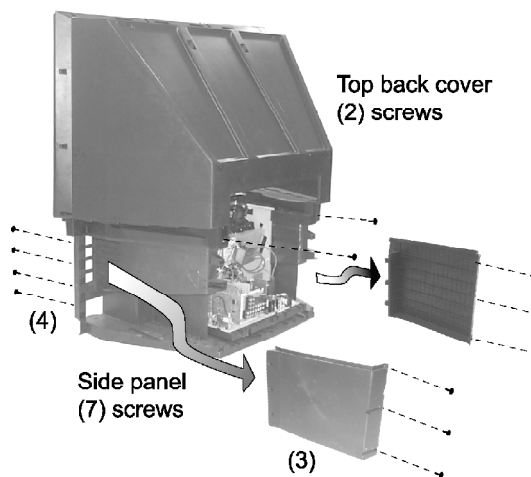
- 1. The back panel is fastened to the cabinet by 12 screws. See picture for screw location.**

Back panel removal



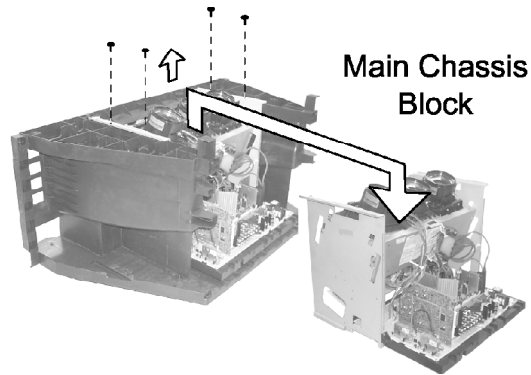
Main chassis block

1. After removing the screen frame and front cover, remove the side panel from each side (each side panel is fastened by 7 screws, 4 at front and 3 in the back).



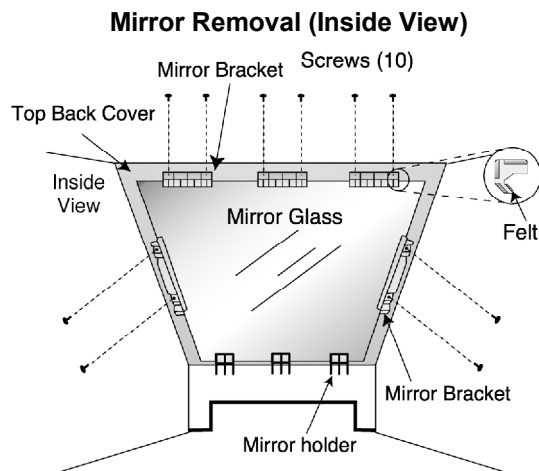
2. Remove the 2 screws from the cabinet body that holds the upper cabinet cover and carefully remove it.
3. The main chassis block is secured to the main body cabinet by 4 screws on the top (see picture).

Chassis removal



Mirror removal

The mirror is attached inside the cabinet cover. Carefully remove the cabinet cover to access its interior surface and remove the screws securing the brackets that hold the mirror at the top and sides to the mirror.



10.1. Chassis assembly

The chassis assembly shown in figure includes all the electrical and optical components (light box).

Chassis back view



A/V BACK COVER ASSEMBLY

This assembly is secured to H-Board by 8 screws.

H-Board

- 1. H-Board is connected to DG-board with H1 connector.**
- 2. Pull carefully to the right to disconnect.**

DG-Board

- 1. Plugs onto A-Board at A13 and A14 connectors (DG3 and DG4 respectively).**
- 2. Remove plug cables from connectors DG5 and DG6.**

NOTE:

This board is non-serviceable. / When removing this board pull carefully.

A-Board

- 1. A-Board is secured to the chassis tray with six screws.**
- 2. The A-Board is mated to D-Board by four flexible connectors (male side of connectors): A1, A2, A3 & A4. To remove this board, unplug the connectors of A-Board pulling from the sides of each connector.**

NOTE:

Some tie wraps that secure the wire dressings may need to be unfastened for chassis removal.

- 3. Remove plug connector in A6 that goes to G-Board (G1).**
- 4. Remove plug connectors in A7, A8 that goes to K-board (K1) and R-board (R1).**

D-Board

- 1. D-Board is secured to the chassis tray with five screws.**
- 2. The D-Board is mated to A-Board by four connectors (female side of connectors): D1, D2, D3 & D4. To remove this board, unplug the connectors on the A-Board pulling from the sides of each connector.**

NOTE:

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

DC-Board

- 1. Plugs onto the D-Board at the D21, D22 and D23 (DC1, DC2 and DC3 respectively) connectors.**

NOTE:

This board is non-serviceable. / When removing this board pull carefully.

R-Board

- 1. This board is secured to the upper front side of the light box by one screw, and plugged to R1 connector from A7 on A-Board.**

LR, LG and LB Board

- 1. Each board is plugged into the socket on the PRT neck, LR-Board on red PRT, LG-Board on green PRT and LB-Board on blue PRT.**

10.2. Dissassembly for service PT-53TW54J

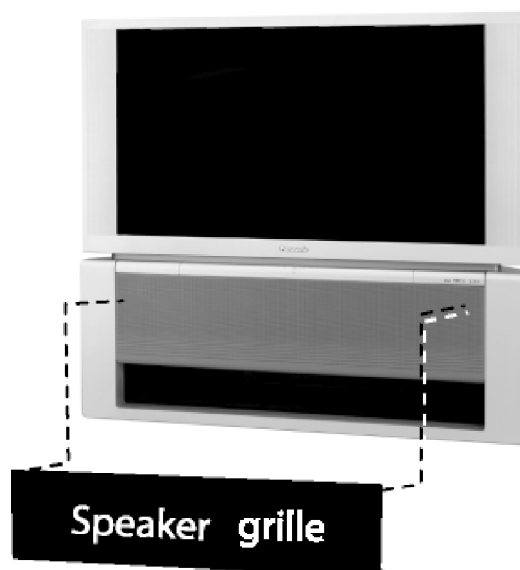
NOTE:

Board ground wires may have to be disconnected to disassemble some boards. All ground wires must be reconnected using jumper leads, if necessary, before power is applied to PTV for service.

Speaker grille removal

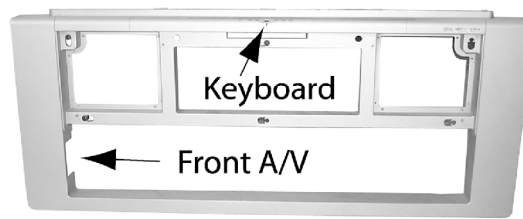
Speaker grille, is secured to the cabinet of the PTV with 6 rubber holders. Grip panel from the sides and middle upper part, and gently pull forward to remove. When reassembling, make certain to firmly press on the panel where the insertion points(6) are located, one at each corner and at the center (top & bottom).

Speaker grille removal



Keyboard, and front A/V inputs removal

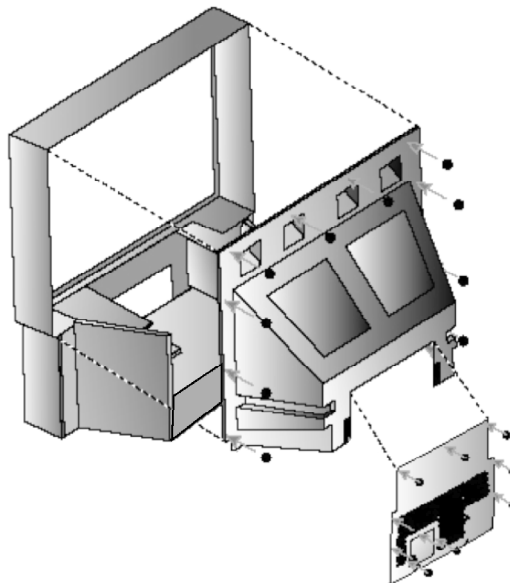
1. Remove the speaker grille.
2. Remove the screws around the woofers. Unplug the connectors from keyboard, and front A/V inputs. Remove the screws (2) affixing the keyboard (top) and front A/V inputs (lower side) from the front panel frame and pull the assembly upward and release it from the front cabinet carefully.



Back lower cover removal

1. Remove (7) hex screws around the perimeter, marked with arrows. See figure for screws location.
2. Remove (9) screws from around the A/V terminal board (marked with arrows).

Back lower cabinet removal



Back cabinet removal

1. Remove the back lower cover. (Detailed previously).
2. The top back cover (plastic shell) is secured with (10) screws around its perimeter. See figure for screws location.
3. Be careful not to damage the mirror secured to the underside of the back cover.

Screen frame removal

1. Disconnect the cables leading to the keyboard, A/V inputs and autoconvergence sensors.
2. At this point the front cover is held only by four screws, be careful not to push the cabinet forward.
3. Remove screws and tilt the assembly forward while lifting it out of place.

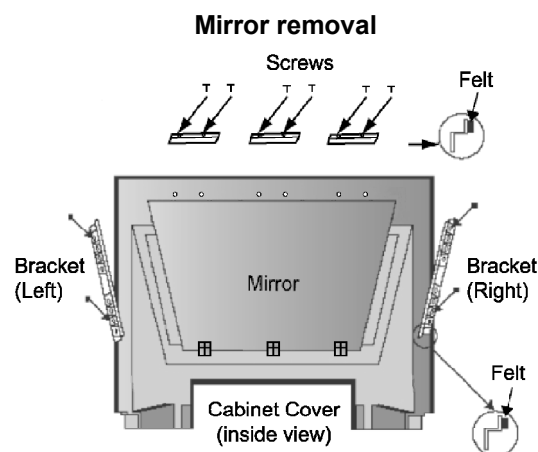
Speakers replacement

The speaker system of the TW models consist in 3 speakers (tweeter, midrange and a woofer) for each channel (left & right). To replace follow this procedure:

1. Remove the speaker grille.
2. Each woofer is secured to the cabinet with 4 screws.
3. Remove the screen frame.
4. Each speaker is secured to the screen frame with 2 screws (tweeter) and 4 screws (midrange).
5. Disconnect the L and R speaker lead connectors from the speaker units.

Mirror removal

The mirror is attached inside the back cabinet cover. Carefully remove the cabinet cover to access its interior surface and remove the screws securing the brackets that hold the mirror at the top and sides to the mirror.



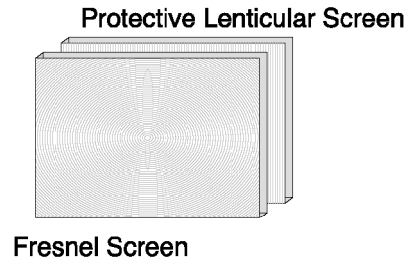
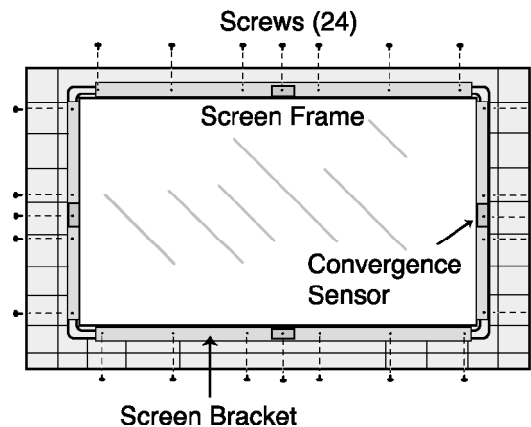
Screen assembly

1. Remove the screen frame. See screen frame removal procedure.
2. Place screen frame face down on a soft surface.
3. Remove all screen brackets and corner brackets

Note:

The brackets are painted black (permanent marker) on the edge to prevent reflection on image.

4. Remove the horizontal barrier panel at the back of the cabinet.



5. Unplug cables connectors (K1, G1, Autoconvergence and speaker connectors) and pull out the main chassis block.

Note:

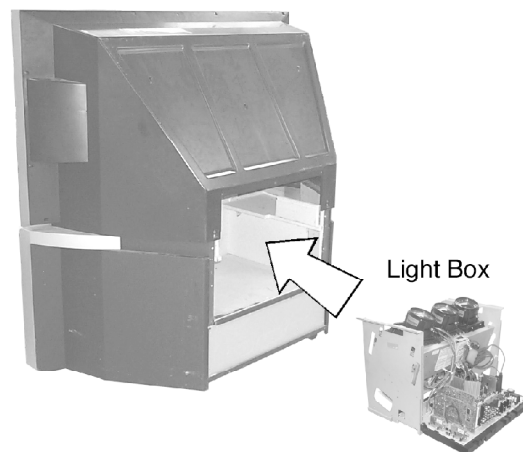
Main chassis block can be serviced either in normal position or laying on its back (protect hookup terminal from damage).

Main chassis block

1. Remove the back lower cabinet cover.

2. The main chassis block is secured to the cabinet by 2 screws at front, behind the Speaker Grill and 3 screws inside on the bottom of the optical frame).
3. Remove the horizontal barrier panel at the back of the cabinet.
4. Unplug cables (K1, G1, Autoconvergence and speaker connectors) and pull out the main chassis block.

Chassis removal



AV BACK COVER ASSEMBLY

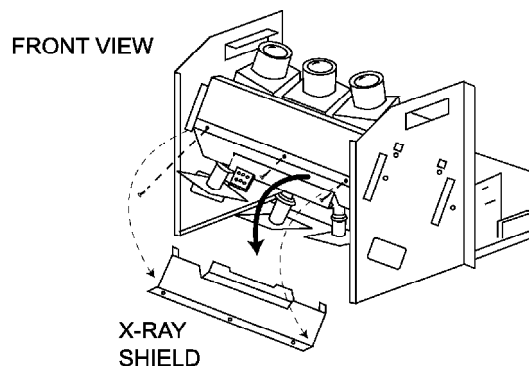
This assembly is secured to H-Board by 8 screws.

10.3. Disassembly for CRT replacement

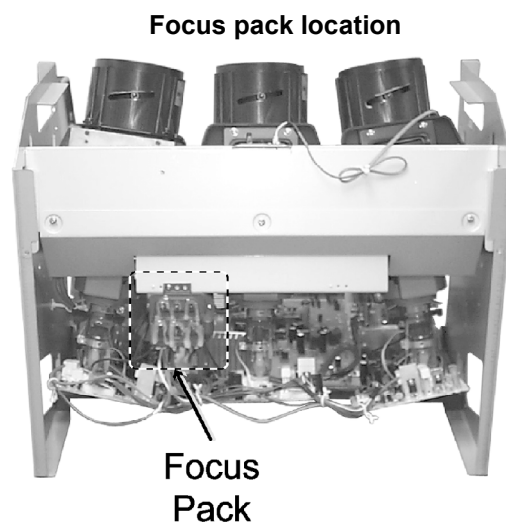
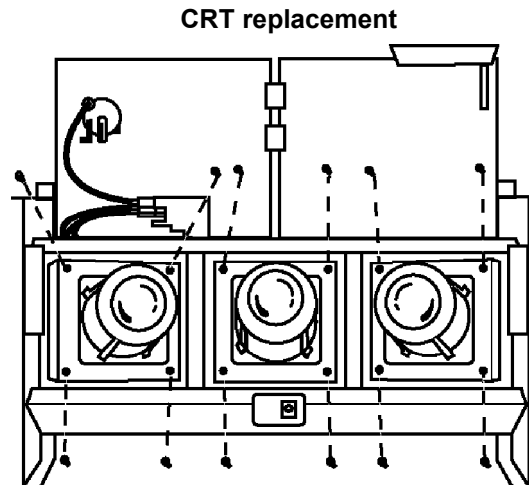
To facilitate CRT replacement, the complete CRT mounting chassis does not need to be removed.

1. Remove the main chassis block from the cabinet.
2. Remove the optical bracket metal cover (front side x-ray shield) by removing 3 screws on top.

CRT replacement



3. Remove the defective CRT anode lead from the high voltage distributor block that is mounted on the flyback transformer. Discharge to CRT chassis.
 4. Unplug connectors from D-Board. See board layout. D14 for red, D15 for green and D16 for blue.
 5. Unplug the defective CRT black DAG ground connector from the CRT Board.
 6. Remove the CRT Board from the defective CRT neck.
 7. Remove (4) screws from the defective CRT housing.
- Caution:**
Do not remove the (4) CRT lens screws. Support the CRT assembly when loosening screws.



8. Release CRT anode lead from CRT chassis wire clamp and all

other wires from holders.

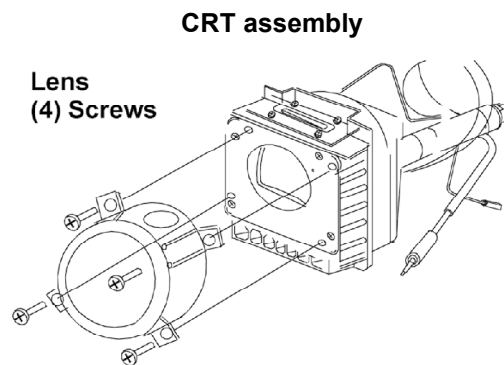
9. Loosen a screw that secures the DY and remove it from the CRT neck.

Caution:

To insure protection against x-ray radiation, the lens must be mounted in place at all times when power is applied to the PTV

CRT replacement

1. Remove CRT focus lens assembly (4 screws)



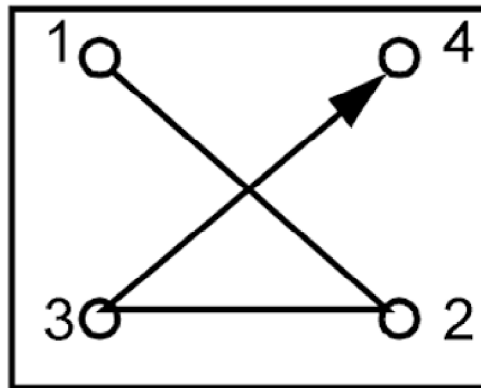
2. Lay CRT face down on a soft cloth.
3. Note position of yoke with centering tabs and remove from defective CRT.
4. Remove CRT DAG ground from defective CRT. Mount it on the replacement CRT exactly as it was on the defective CRT.

Note:

Replacement CRT is supplied with H.V. anode lead attached.

5. Wire the anode lead wire.
6. Install yoke with other CRT neck assemblies on CRT neck in the same order and position as removed from the defective CRT.
7. Press yoke against bell of CRT and tighten the clamp just snug enough so it will not easily shift.
8. Assemble CRT focus lens assembly to new CRT with (4) screws. Make sure focus lens adjustment nut is in the same location as on other CRT focus lens

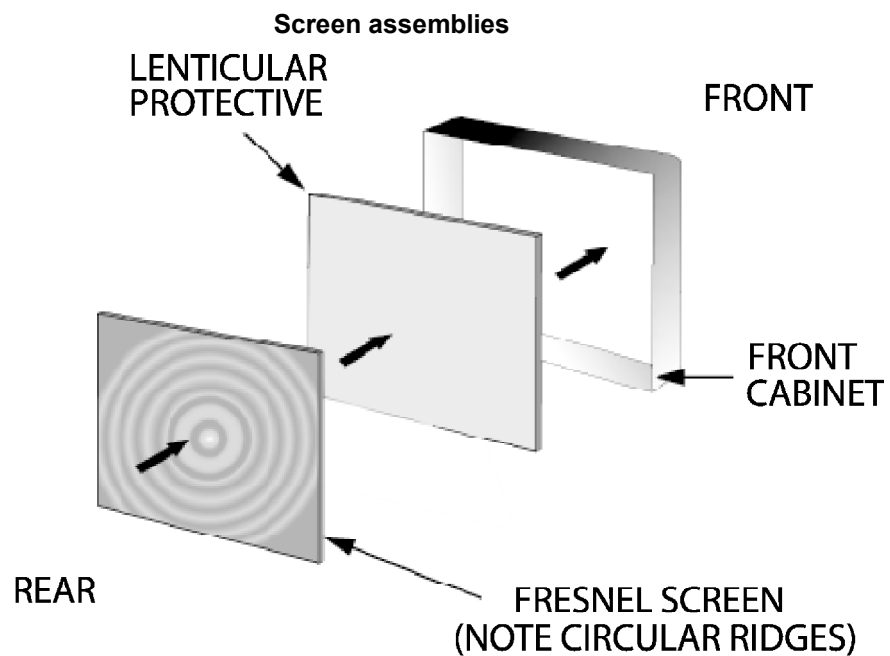
CRT screw tightening order



Note:

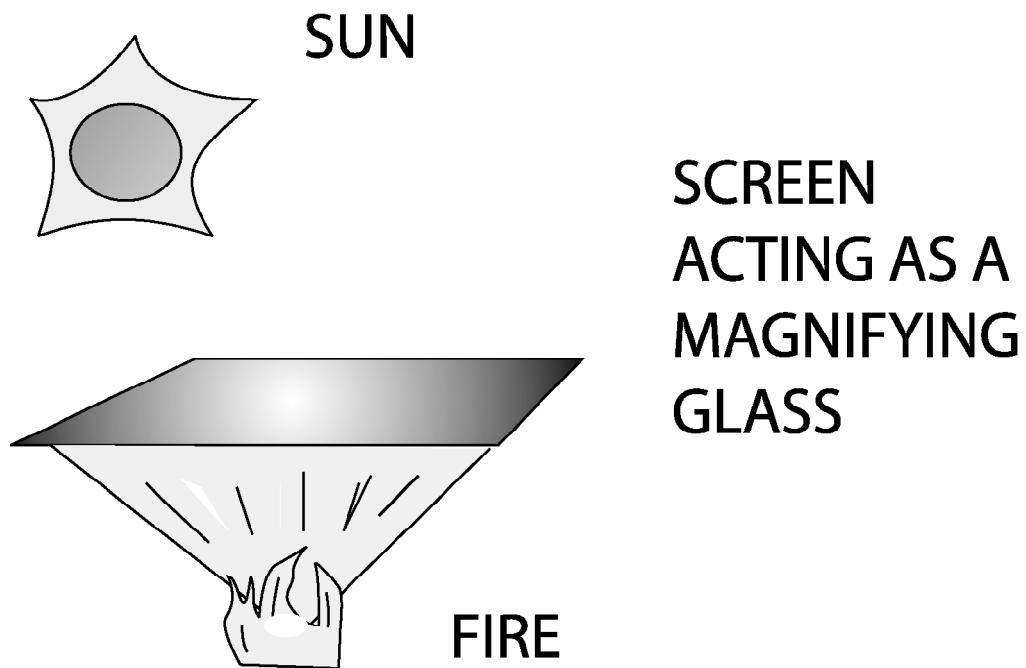
Please assemble with screws in the order shown and tighten with the same torque.

10.4. PT-53TW54J screen assemblies



10.5. Screen assemblies warning

When storing or disposing of screen assemblies, be sure not to place them in direct sunlight. These screens may act as a magnifying glass and could cause a fire.



10.6. Convergence alignment template

The convergence alignment template is a grid approximately the size of the viewing screen used to ensure the proper size and shape of the alignment rasters. It is 6 blocks across by 6 blocks high. Apply a convergence alignment template to the viewingscreen of the PTV. Make sure the center lines are properly aligned. If a template is not available, one can be created by following the instructions below. Create a convergence alignment template by drawing a pattern, as in the figure, in the actual dimensions on transparent film or tracing paper. Start with the Horizontal and Vertical Center Axis and work outwards until the pattern is complete. Pay attention to the actual dimensions of the pattern.

Template dimensions:

- 47": 1037mm horizontal x 83.43mm vertical.
- 53": 1173.3mm horizontal x 660mm vertical.

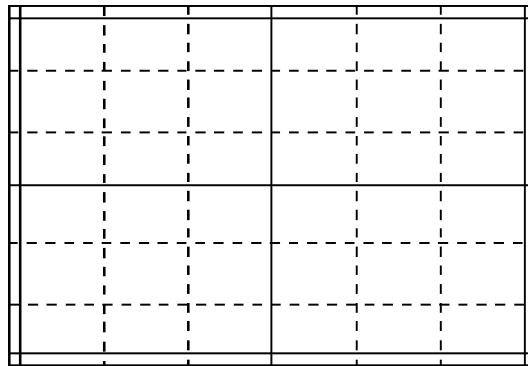
Single grid dimension:

SCREEN SIZE	HORIZONTAL	VERTICAL
47"	167.83mm	83.43mm
53"	189.22 mm	94.29 mm

NOTE:

A convergence alignment template, part number TXFQD01JSER is available through Matsushita/Panasonic Services

Convergence template.



11. Reference of PDF links color

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
SCHEMATIC	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
PCB	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
BLOCK DIAGRAMS	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

12. Conductor views

12.1. Printed Circuit Board - A (page 1 of 2)

12.2. Printed Circuit Board - A (page 2 of 2)

12.3. Printed Circuit Boards - G & K

13. Schematic diagrams

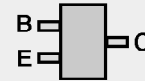
13.1. Schematic diagrams notes

Notes:

IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A Δ IN THE SCHEMATIC.

CHIP TRANSISTOR LEAD DESIGNATION



SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
 - Capacitors are ceramic 50V unless noted otherwise.
 - Coil value notes is inductance in μ H.
 - Test point indicated by \uparrow ; Test point but no pin \uparrow .
 - Components indicated with Δ are critical parts and replacement should be made with manufacture specified replacement parts only.
 - (**BOLD LINE**) indicates the route of B+ supply.
 - The schematic diagrams are current at the time of printing and are subject to change without notice.
 - Ground symbol \downarrow indicates **HOT GROUND CONNECTION**; \uparrow indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

VOLTAGE MEASUREMENTS

- Voltage measurement:
 - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
 - All Picture and Audio adjustments are set to Normalize.
 - TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode
 - Volume - Min.
 - TV/Video SW - TV position
 - Audio Mode - Stereo
 - Voltage readings are nominal and may vary $\pm 10\%$ on active devices. Some voltage reading will vary with signal strength and picture content.
 - Supply voltages are nominal.
 - Ground symbol \downarrow indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

WAVEFORM MEASUREMENTS


- $\textcircled{3}$ indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
 - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
 - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
 - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 1). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
 - Ground symbol \downarrow shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



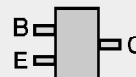
13.2. Notas de los diagramas esquemáticos

Notas







NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRÍTICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRÍTICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SÍMBOLO .


IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP





NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W, a menos que se indique otra característica.
 - Los Capacitores son de Cerámica para 50V, a menos que se indique otra característica.
 - El valor indicado de las Bobinas es la inductancia expresada en μH .
 - Los puntos de prueba en la terminal de algún componente son indicados por  Los puntos de prueba fuera de los componentes se indican con .
 - Los componentes señalados con el símbolo  son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
 -  (LINEA GRUESA) indica las líneas de alimentación de los Voltajes B+.
 - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
 - El símbolo  indica que es una conexión a **Tierra Caliente** y el símbolo  indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

MEDICIÓN DE VOLTAJES

- Medición de voltaje:
 - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
 - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
 - Las fuentes de voltajes son nominales.
 - El símbolo  indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como  indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
 - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EAI, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se ajusta al mínimo
 - banda alta y con un punta de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
 - El símbolo de tierra  que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

ajusta al mínimo. 4. Las formas de onda de Video y Color fueron tomadas con un osciloscopio de	<i>mediciones equivocadas y podría dañar el equipo de medición.</i>
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13.3. A-Board schematic (1 of 3)

13.4. A-Board schematic (2 of 3)

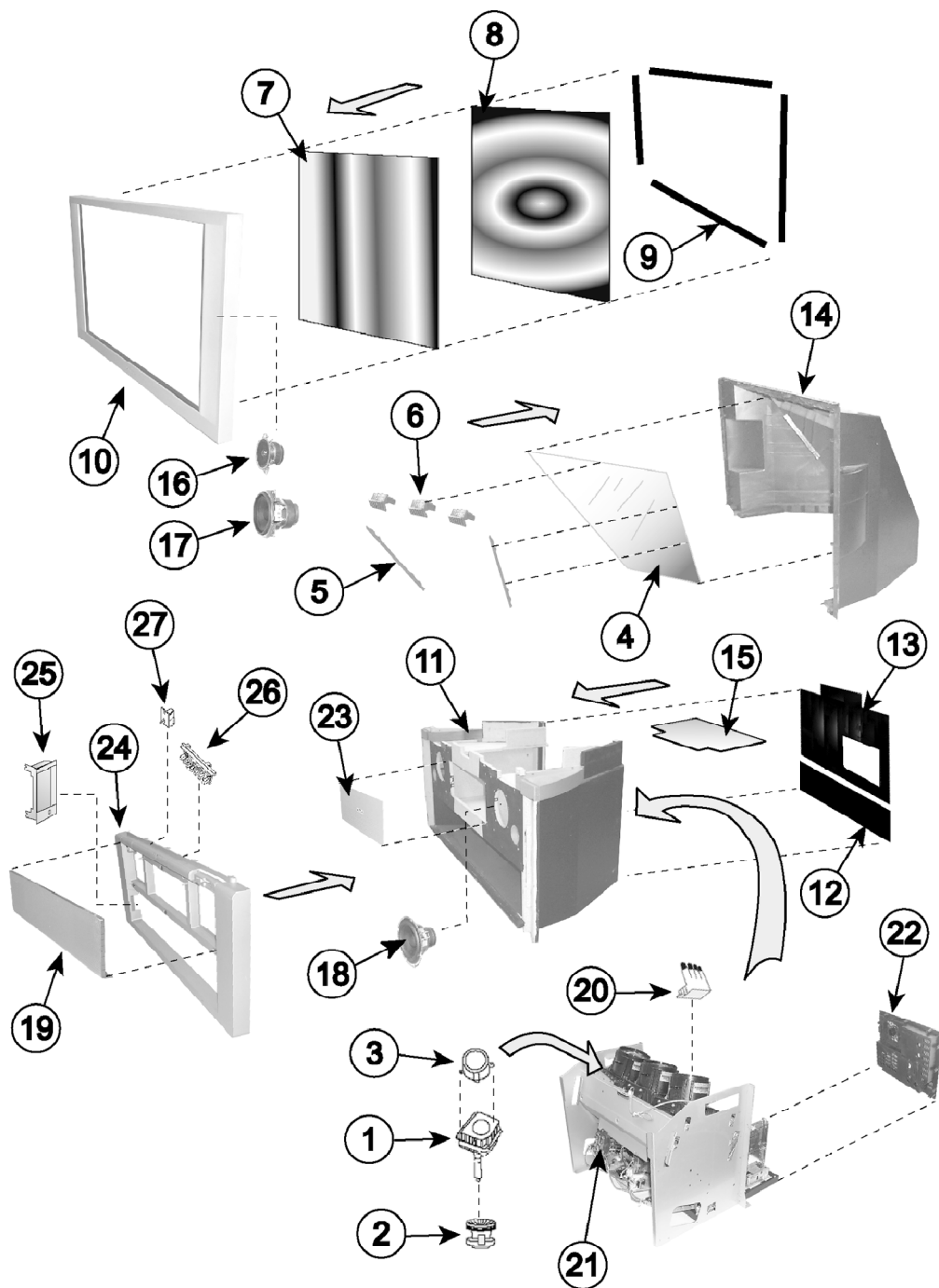
13.5. A-Board schematic (3 of 3)

13.6. G & K Boards schematics

14. Parts location PT-53TW54J

***For PT-47X54J parts location, refer to Main service manual order No.MTNC040520C1**


PT-53TW54J parts location.



15. Parts list

15.1. Description of abbreviations guide

Important Safety Notice

Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use manufacturer's specified parts.

Abbreviation of part name and description

1. Resistor

Example :

ERD25TJ104 **C** 100K Ω , **J**, 1/4W
Type Allowance

Type	Allowance
C : Carbon	F : $\pm 1\%$
F : Fuse	G : $\pm 2\%$
M : Metal Oxide Metal Film	J : $\pm 5\%$ K : $\pm 10\%$
S : Solid	M : $\pm 20\%$
W : Wire Wound	

2. Capacitor






Example :








ECKF1H103ZF **C** 0.01 μ F, **Z**, 50V
Type Allowance

Type	Allowance
C : Carbon	C : $\pm 0.25\text{pF}$
E : Electrolytic	D : $\pm 0.5\text{pF}$
P : Polyester Polypropylene	F : $\pm 1\text{pF}$ G : $\pm 3\%$
T : Tantalum	J : $\pm 5\%$ K : $\pm 10\%$ L : $\pm 15\%$ M : $\pm 20\%$ P : $\pm 100\%$, -0% Z : $\pm 80\%$, -20%

15.2. Parts list

Ref. No.	Part No.	Part Name & Description	Remarks
CAPACITORS			
C001	ECA1HM4R7B	CAP E 4.7UF-50V	
C003	ECJ2VC1H101J	CAP C 100PF-J-50V	
C004	ECJ2VF1E224Z	CAP C .22UF-Z-25V	
C006	EEUFC1A471B	CAP E 470UF-10V	
C007	ECA1HM4R7B	CAP E 4.7UF-50V	
C009	ECJ2VC1H101J	CAP C 100PF-J-50V	
C010	ECJ2VF1E224Z	CAP C .22UF-Z-25V	
C012	EEUFC1A471B	CAP E 470UF-10V	
C015	F2A1H2R2A162	CAP E 2.2UF-50V	
C016	F2A1H2R2A162	CAP E 2.2UF-50V	
C051	EEUFC1E470B	CAP E 47UF-25V	
C052	TACCX103T50V	CAP C .01UF-50V	
C302	ECCR1H221JC5	CAP C 220PF-J-50V	
C304	ECQE2104KFW	CAP P .10UF-K-200V	
C305	ECA1HM470B	CAP E 47UF-50V	
C306	ECA2EM100E	CAP E 10UF-250V	
C307	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C308	ECA1HM220B	CAP E 22UF-50V	
C309	ECA2EM100B	CAP E 10UF-250V	
C312	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C313	ECKR2H102KB5	CAP C 1000PF-K-500V	
C315	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C331	ECA1HM470B	CAP E 47UF-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C332	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C333	ECA1HM470B	CAP E 47UF-50V	
C334	ECA2EM470B	CAP E 47UF-250V	
C335	ECCR1H221JC5	CAP C 220PF-J-50V	
C336	ECA1HM470B	CAP E 47UF-50V	
C337	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C339	ECQE2104KFW	CAP P .10UF-K-200V	
C340	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C341	ECA2EM100B	CAP E 10UF-250V	
C345	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C346	ECKR2H102KB5	CAP C 1000PF-K-500V	
C362	ECCR1H221JC5	CAP C 220PF-J-50V	
C364	ECQE2104KFW	CAP P .10UF-K-200V	
C365	ECA2EM100B	CAP E 10UF-250V	
C366	ECA1HM470B	CAP E 47UF-50V	
C367	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C368	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C372	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C373	ECKR2H102KB5	CAP C 1000PF-K-500V	
C374	ECA1CM101B	CAP E 100UF-16V	
C405	ECA1EHG102E	CAP E 1000UF-25V	
C406	ECA1EHG102E	CAP E 1000UF-25V	
C407	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C408	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C411	ECJ2VB1H822K	CAP C .0082UF-K-50V	
C412	ECQB1224KF3	CAP P .22UF-K-100V	
C413	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C414	ECJ2VB1H272K	CAP C .0027UF-K-50V	
C417	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C418	ECJ2VF1H223Z	CAP C .022UF-Z-50V	
C421	ECEA1CN220UB	CAP E 22UF-16V	
C458	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C461	ECA1HHG221B	CAP E 220UF-50V	
C501	ECA1EM101B	CAP E 100UF-25V	
C502	ECQV1H105JL3	CAP P 1.0UF-J-50V	
C503	ECKR2H102KB5	CAP C 1000PF-K-500V	
C509	ECWF2474JSR	CAP P .47UF-J-200V	
C510	ECJ2VC1H221J	CAP C 220PF-J-50V	
C511	ECWH20222JVY	CAP P 2200PF-J-2KV	
C512	ECWH20202JVY	CAP P 2000PF-J-2KV	
C513	ECQF4103JZH	CAP P .01UF-J-400V	
C514	ECWH20222JVY	CAP P 2200PF-J-2KV	
C518	ECKW3D221JBP	CAP C 220PF-J-2KVDC	
C519	ECKW3D221JBP	CAP C 220PF-J-2KVDC	
C520	ECQB1H103JF3	CAP P .01UF-J-50V	
C524	ECQB1224JF3	CAP P .22UF-J-100V	
C525	ECEA1HN220UB	CAP E 22UF-50V	
C526	ECA2EM101E	CAP E 100UF-250V	
C527	ECKR2H102KB5	CAP C 1000PF-K-500V	
C528	ECA1HM470B	CAP E 47UF-50V	
C531	ECA160V33UE	CAP E 33UF-160V	

Ref. No.	Part No.	Part Name & Description	Remarks
C533	ECKR2H101KB5	CAP C 100UF-K-500V	
C535	ECA1EM471E	CAP E 470UF-25V	
C601	EEUFC1C331B	CAP E 330UF-16V	
C602	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C653	ECA1HM010E	CAP E 1UF-50V	
C654	ECA1HM010E	CAP E 1UF-50V	
C701	ECA1CM101B	CAP E 100UF-16V	
C702	ECKW3D271KBP	CAP C 270PF-K-2KV	
C703	ECQM2104KZW	CAP P .1UF-K-200V	
C704	ECKR2H391KB5	CAP C 390PF-K-500V	
C707	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C708	ECQE1685KFB	CAP P 6.8UF-K-100V	
C801	ECQU2A474MLA	CAP. P. 47UF-M-250VAC	
C802	ECQU2A474MLA	CAP. P. 47UF-M-250VAC	
C803	ECKCNA222ME7	CAP C 2200PF-M-125V	
C804	ECKCNA222ME7	CAP C 2200PF-M-125V	
C805	ECKW2H472PU7	CAP C 4700PF-P-500V	
C806	ECKW2H472PU7	CAP C 4700PF-P-500V	
C807	ECKW2H472PU7	CAP C 4700PF-P-500V	
C808	ECA1EM101B	CAP E 100UF-25V	
C809	ECJ2VB1E223K	CAP C .022UF-K-25V	
C810	EETED2D102C	CAP E 1000PF-200V	
C812	ECA1EHG471B	CAP E 470UF-25V	
C814	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C815	ECQB1H152JF3	CAP P 1500PF-J-50V	
C817	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C819	ECQB1H102JF3	CAP P 1000PF-J-50V	
C820	ECQV1H334JL3	CAP P .33UF-J-50V	
C821	ECQB1H272KF3	CAP P 2700PF-K-50V	
C822	ECA1HM220B	CAP E 22UF-50V	
C823	ECJ2VC1H151J	CAP C 150PF-J-50V	
C824	EEUFC1V151B	CAP E 150UF-35V	
C825	ECKCNA102MBB	CAP C .001UF-M-125V	
C826	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C830	EETHC2C471B	CAP E 470PF-160V	
C831	ECKW3D821KBP	CAP C 820PF-K-2KV	
C832	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C834	EEUFC1V222E	CAP E 2200UF-35V	
C836	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C837	ECA1EM472E	CAP E 4700UF-25V	
C839	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C841	ECA1EM472E	CAP E 4700UF-25V	
C842	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C843	ECA1VM222E	CAP E 2200UF-35V	
C844	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C845	ECA1VM222E	CAP E 2200UF-35V	
C846	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C848	ECA1CM101B	CAP E 100UF-16V	
C849	ECKR1H223ZF5	CAP C .022UF-Z-50V	
C851	ECQV1H104JL3	CAP P .10UF-J-50V	
C852	ECA1EM101B	CAP E 100UF-25V	

Ref. No.	Part No.	Part Name & Description	Remarks
C853	ECJ2YF1E474Z	CAP C .47UF-Z-25V	
C854	ECA1CM101B	CAP E 100UF-16V	
C855	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C856	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C860	ECJ2VB1H103K	CAP C .01UF-K-50V	
C861	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C862	ECJ2VB1H103K	CAP C .01UF-K-50V / PT-47X54J	
C863	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C864	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C865	ECA1CM221B	CAP E 10UF-16V	
C866	ECA0JM221B	CAP E 220UF-6.3V	
C867	ECA1CM221B	CAP E 10UF-16V	
C868	EEUFC1C471B	CAP E 470UF-16V	
C869	EEUFC1A471B	CAP E 470UF-10V	
C870	EEUFC1A471B	CAP E 470UF-10V	
C874	ECA1VM221B	CAP E 220UF-35V	
C875	ECA1VM221B	CAP E 220UF-35V	
C876	ECA1VM221B	CAP E 220UF-35V	
C877	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C878	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C879	ECA0JM221B	CAP E 220UF-6.3V	
C880	ECA0JM221B	CAP E 220UF-6.3V	
C885	EEUFC1A471B	CAP E 470UF-10V	
C886	EEUFC1A471B	CAP E 470UF-10V	
C889	ECA1VM221B	CAP E 220UF-35V	
C890	ECA1VM221B	CAP E 220UF-35V	
C902	ECQM2103KZ3	CAP P .01UF-K-200V	
C903	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C904	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C906	ECQM2103KZ3	CAP P .01UF-K-200V	
C907	ECA2CM100E	CAP E 10UF-160V	
C908	ECA1CM101B	CAP E 100UF-16V	
C909	ECA1CM101B	CAP E 100UF-16V	
C910	ECA2CM100E	CAP E 10UF-160V	
C911	ECQE2104KFW	CAP P .10UF-K-200V	
C912	ECA1HM220B	CAP E 22UF-50V	
C913	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C916	ECQE2104KFW	CAP P .10UF-K-200V	
C939	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C940	ECQM2103KZ3	CAP P .01UF-K-200V	
C941	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C942	ECQM2103KZ3	CAP P .01UF-K-200V	
C943	ECA2CM100E	CAP E 10UF-160V	
C944	ECA1CM101B	CAP E 100UF-16V	
C945	ECA1CM101B	CAP E 100UF-16V	
C947	ECA2CM100E	CAP E 10UF-160V	
C948	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C949	ECQE2104KFW	CAP P .10UF-K-200V	
C962	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C963	ECQM2103KZ3	CAP P .01UF-K-200V	
C964	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C965	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C966	ECQM2103KZ3	CAP P .01UF-K-200V	
C967	ECA2CM100E	CAP E 10UF-160V	

Ref. No.	Part No.	Part Name & Description	Remarks
C968	ECA1CM101B	CAP E 100UF-16V	
C969	ECA1CM101B	CAP E 100UF-16V	
C970	ECA2CM100E	CAP E 10UF-160V	
C971	ECQE2104KFW	CAP P .10UF-K-200V	
C972	ECA1HM220B	CAP E 22UF-50V	
C972	ECA1HM220B	CAP E 22UF-50V	
C1304	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C1305	ECJ2VB1C104K	CAP C .1UF-K-16V	
C1306	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1307	ECA1CM101B	CAP E 100UF-16V	
C1502	ECQE6104KFB	CAP P 100UF-K-100V	
C1503	ECQE6104KFB	CAP P 100UF-K-100V	
C1504	ECJ2FB1H104K	CAP C .1UF-K-50V	
C1505	ECA1CM101B	CAP E 100UF-16V	
C1506	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1508	ECA1CM101B	CAP E 100UF-16V	
C1509	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C1510	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1511	ECJ2VC1H471J	CAP C 470PF-J-50V	
C1513	ECEA1EN101UB	CAP E 100UF-25V	
C1514	ECA1CM101B	CAP E 100UF-16V	
C2201	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2202	ECA1HM100B	CAP E 10UF-50V	
C2203	ECA1HMR47B	CAP E .47UF-50V	
C2204	ECQB1H473JF3	CAP P .047UF-J-50V	
C2205	ECSF1CE335VB	CAP E 33MF-16V	
C2206	ECQB1H223JF3	CAP P .022UF-J-50V	
C2207	ECA1HM010B	CAP E 1UF-50V	
C2208	ECSF1CE106VB	CAP E 10UF-16V	
C2209	ECA1HM4R7B	CAP E 4.7UF-50V	
C2210	ECA1HM2R2B	CAP E 2.2UF-50V	
C2210	F2A1H2R2A162	CAP E 2.2UF-50V	
C2211	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2212	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2214	ECA1CM101B	CAP E 100UF-16V	
C2215	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2216	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2303	ECA50YT1R5KB	CAP E 1.5UF-50V / PT-47X54J	
C2303	ECA50YT2R2KB	CAP E 2.2UF-50V / PT-53TW54J	
C2306	ECA50YT1R5KB	CAP E 1.5UF-50V / PT-47X54J	
C2306	ECA50YT2R2KB	CAP E 2.2UF-50V / PT-53TW54J	
C2309	ECQB1H224JF3	CAP P .22UF-J-50V / PT-53TW54J	
C2310	ECQB1H224JF3	CAP P .22UF-J-50V	
C2313	F1J1C225A083	CAP C 2.2UF-Z-16V / PT-53TW54J	
C2314	F1J1C225A083	CAP C 2.2UF-Z-16V	
C2315	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2316	ECJ3VB1H104K	CAP C .1UF-K-50V / PT-53TW54J	
C2317	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2318	ECJ2VB1H333K	CAP C .033UF-K-50V / PT-53TW54J	
C2319	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2320	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-53TW54J	
C2321	ECQB1H224JF3	CAP P .22UF-J-50V / PT-53TW54J	
C2322	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2323	ECQB1H224JF3	CAP P .22UF-J-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C2324	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2325	ECJ2VB1H103K	CAP C .01UF-K-50V / PT-53TW54J	
C2326	ECJ2VB1H471K	CAP C 470PF-K-50V / PT-53TW54J	
C2327	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2328	ECJ2VC1H270J	CAP C 27PF-J-50V / PT-53TW54J	
C2329	ECJ2VC1H270J	CAP C 27PF-J-50V	
C2330	ECJ2VB1H471K	CAP C 470PF-K-50V / PT-53TW54J	
C2331	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2332	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2333	ECJ2VB1H331K	CAP C 330PF-K-50V / PT-53TW54J	
C2334	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V / PT-47X54J	
C2334	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2335	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V / PT-47X54J	
C2336	ECJ2VB1H102K	CAP C .001UF-K-50V / PT-53TW54J	
C2337	ECJ2VB1H331K	CAP C 330PF-K-50V	
C2338	ECJ2VB1H102K	CAP C .001UF-K-50V / PT-53TW54J	
C2338	ECJ2VB1H682K	CAP C .0068UF-K-50V / PT-47X54J	
C2339	ECJ3VB1H104K	CAP C .1UF-K-50V / PT-53TW54J	
C2340	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2341	ECJ2VB1H331K	CAP C 330PF-K-50V / PT-53TW54J	
C2342	ECJ2VB1H331K	CAP C 330PF-K-50V	
C2343	ECJ3VB1H104K	CAP C .1UF-K-50V / PT-53TW54J	
C2344	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2345	ECJ2VB1H471K	CAP C 470PF-K-50V / PT-53TW54J	
C2346	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2347	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2348	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V / PT-47X54J	
C2348	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2349	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V / PT-47X54J	
C2350	ECJ2VB1H102K	CAP C .001UF-K-50V / PT-53TW54J	
C2351	ECJ2VB1H471K	CAP C 470PF-K-50V / PT-53TW54J	
C2352	ECJ2VB1H102K	CAP C .001UF-K-50V / PT-53TW54J	
C2352	ECJ2VB1H682K	CAP C .0068UF-K-50V / PT-47X54J	
C2353	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2354	ECJ2VB1H103K	CAP C .01UF-K-50V / PT-53TW54J	
C2355	ECJ2VB1H333K	CAP C .033UF-K-50V / PT-53TW54J	
C2356	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2357	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2358	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-53TW54J	
C2359	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2360	ECJ3VB1H104K	CAP C .1UF-K-50V / PT-53TW54J	
C2361	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2362	ECJ3VB1H104K	CAP C .1UF-K-50V / PT-53TW54J	
C2363	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2364	EEUFC1E222E	CAP E 2200UF-25V / PT-53TW54J	
C2365	EEUFC1E222E	CAP E 2200UF-25V	
C2366	ECJ2VF1C474Z	CAP C .47UF-Z-16V / PT-53TW54J	
C2367	EEUFC1E222E	CAP E 2200UF-25V / PT-53TW54J	
C2368	EEUFC1E222E	CAP E 2200UF-25V	
C2369	ECEA1CN100UB	CAP E 10UF-16V	
C2370	ECEA1CN100UB	CAP E 10UF-16V	
C2371	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2372	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2373	ECA1HM100B	CAP E 10UF-50V	





Ref. No.	Part No.	Part Name & Description	Remarks
C2374	ECA1EM101B	CAP E 100UF-25V	
C2375	ECA1HM100B	CAP E 10UF-50V	
C2376	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2377	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2378	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2379	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2381	ECEA1HN010UB	CAP E 1UF-50V / PT-47X54J	
C2381	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-47X54J	
C2382	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-47X54J	
C2383	ECEA1HN010UB	CAP E 1UF-50V / PT-47X54J	
C2394	ECJ2VF1H104Z	CAP C .1UF-Z-50V / PT-47X54J	
C2398	ECJ2VF1H104Z	CAP C .1UF-Z-50V / PT-47X54J	
C2403	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-47X54J	
C2404	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-47X54J	
C2421	ECJ2VB1H561K	CAP C 560PF-K-50V / PT-47X54J	
C2426	ECJ2VF1H104Z	CAP C .1UF-Z-50V / PT-47X54J	
C2434	ECJ2VF1H104Z	CAP C .1UF-Z-50V / PT-47X54J	
C2451	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2452	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2453	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2454	ECJ2VB1H222K	CAP C .0022UF-K-50V	
C2455	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2456	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2457	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2458	ECA1HM4R7B	CAP E 4.7UF-50V	
C2459	ECA1HM4R7B	CAP E 4.7UF-50V	
C2460	ECJ2VB1H103K	CAP C .01UF-K-50V	
C2461	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2462	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2463	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2464	ECJ2VB1H222K	CAP C .0022UF-K-50V	
C2465	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2466	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2467	ECA1HM4R7B	CAP E 4.7UF-50V	
C2468	ECA1HM4R7B	CAP E 4.7UF-50V	
C2469	ECA1HM4R7B	CAP E 4.7UF-50V	
C2470	ECA1CM101B	CAP E 100UF-16V	
C3201	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3202	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3203	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3331	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3332	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3333	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3334	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3335	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3336	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3337	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3338	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3339	ECJ2VB1H103K	CAP C .01UF-K-50V	
C3340	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3341	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3342	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3343	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3344	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C3345	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3346	ECJ2VB1H103K	CAP C .01UF-K-50V	
C3347	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3348	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3349	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3350	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3351	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3352	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3353	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3354	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3355	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3357	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3358	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3359	ECA1EM471E	CAP E 470UF-25V	
C3360	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3361	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3362	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3363	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3364	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3365	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3366	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3367	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3368	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3369	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C7001	ECJ3YF1E225Z	CAP C 2.2UF-Z-25V	
C7002	ECJ3YF1E225Z	CAP C 2.2UF-Z-25V	
C7004	ECA1EHG221B	CAP E 220UF-25V	
C7006	ECA1EHG221B	CAP E 220UF-25V	
C7015	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7016	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7017	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7018	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7032	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7033	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7034	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7035	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7050	ECA1VM470B	CAP E 47UF-35V	
C7060	ECA1CHG101B	CAP E 100UF-16V	
C7061	ECA1CHG101B	CAP E 100UF-16V	
C7065	ECA1VM470B	CAP E 47UF-35V	
DIODES			
D001	MAZ31500ML	DIODE ZENER	
D002	MAZ31500ML	DIODE ZENER	
D003	MAZ31500ML	DIODE ZENER	
D004	MAZ31500ML	DIODE ZENER	
D081	LN21RCPHL	DIODE	
D082	MAZ40560MF	DIODE ZENER	
D083	MAZ40560MF	DIODE ZENER	
DG1	TJSF17350	CONNECTOR	
DG3	TJSF17435	CONNECTOR	
D301	MA2C16700E	DIODE	
D302	MAZ40680LF	DIODE ZENER	
D303	TVSRM1V1	DIODE	
D304	B0HALP000002	DIODE FAST RECOVERY	

Ref. No.	Part No.	Part Name & Description	Remarks
D304	MA2C165001VT	DIODE	
D306	MA2C165001VT	DIODE	
D307	MA2C165001VT	DIODE	
D312	MA2C18800E	DIODE	
D313	MA2C18800E	DIODE	
D314	MA2C18800E	DIODE	
D315	MA2C18800E	DIODE	
D331	B0HALP000002	DIODE FAST RECOVERY	
D331	MA2C165001VT	DIODE	
D334	MA2C165001VT	DIODE	
D335	MA2C165001VT	DIODE	
D339	MA2C18800E	DIODE	
D340	MA2C18800E	DIODE	
D341	MA2C18800E	DIODE	
D342	MA2C18800E	DIODE	
D361	B0HALP000002	DIODE FAST RECOVERY	
D361	MA2C165001VT	DIODE	
D363	MA2C165001VT	DIODE	
D364	MA2C165001VT	DIODE	
D369	MA2C18800E	DIODE	
D370	MA2C18800E	DIODE	
D371	MA2C18800E	DIODE	
D372	MA2C18800E	DIODE	
D407	MA3X152K0L	DIODE	
D409	MA3X152K0L	DIODE	
D410	MA3X152K0L	DIODE	
D411	MA3X152K0L	DIODE	
D451	B0EAKC000003	DIODE RECTIFIER	
D452	B0EAKC000003	DIODE RECTIFIER	
D453	B0EAKC000003	DIODE RECTIFIER	
D454	B0EAKC000003	DIODE RECTIFIER	
D455	B0EAKC000003	DIODE RECTIFIER	
D456	B0EAKC000003	DIODE RECTIFIER	
D458	B0EAKL000008	DIODE RECTIFIER	
D465	MAZ40390MF	DIODE ZENER	
D466	MA3X152K0L	DIODE	
D501	B0HALP000002	DIODE FAST RECOVERY	
D502	MAZ31500ML	DIODE ZENER	
D503	B0HBRV000001	DIODE FAST RECOVERY	
D504	MAZ42700MF	DIODE ZENER	
D509	MA3X152K0L	DIODE	
D510	MAZ30820LL	DIODE ZENER	
D511	B0HAHP000014	DIODE FAST RECOVERY	
D512	B0HALP000002	DIODE FAST RECOVERY	
D513	MA2C165001VT	DIODE	
D0514	MAZ30300LL	DIODE ZENER	
D515	B0HALP000002	DIODE FAST RECOVERY	
D516	EU2YXV0	DIODE	
D519	AU02ZV0	DIODE	
D520	MA3X152K0L	DIODE	
D634	MA2C165001VT	DIODE	
D650	MAZ41100MF	DIODE ZENER	
D651	MAZ41100MF	DIODE ZENER	
D656	MAZ41100MF	DIODE ZENER	



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Ref. No.	Part No.	Part Name & Description	Remarks
D657	MAZ41100MF	DIODE ZENER	
D659	MAZ41100MF	DIODE ZENER	
D660	MAZ41100MF	DIODE ZENER	
D662	MAZ41100MF	DIODE ZENER	
D663	MAZ41100MF	DIODE ZENER	
D702	B0HALP000002	DIODE FAST RECOVERY	
D801	D3SB80-4101	DIODE	
D802	D4EAB3610002	DIODE	
D804	B0EBKM000016	DIODE / PT-53TW54J	
D804	B0EBKM000016	DIODE RECTIFIER / PT-47X54J	
D815	MA2C165001VT	DIODE	
D816	MA2C70000F	DIODE	
D817	AU01ZV0	DIODE	
D818	MAZ32700LL	DIODE ZENER	
D819	B0BA01000046	DIODE VOLTAGE REGULATION	
D822	B0AAGM000006	DIODE SWITCHING	
D825	SF5L60U-4115	GERMANIUM DIODE	
D827	SF5LC30-4115	GERMANIUM DIODE	
D828	SF5LC30-4115	GERMANIUM DIODE	
D829	SF5LC30-4115	GERMANIUM DIODE	
D830	B0HAPM000012	DIODE FAST RECOVERY	
D831	B0HAPM000012	DIODE FAST RECOVERY	
D835	B0JAME000052	DIODE SCHOTTKY BARRIER	
D837	MA3X152K0L	DIODE	
D870	MA2C165001VT	DIODE	
D872	MA2062-BTP	DIODE	
D873	MAZ31500ML	DIODE ZENER	
D874	MA2120-ATP	DIODE	
D875	MA2062-BTP	DIODE	
D880	B0JCME000025	DIODE SCHOTTKY BARRIER	
D881	B0JCME000025	DIODE SCHOTTKY BARRIER	
D882	B0JCME000025	DIODE SCHOTTKY BARRIER	
D884	MA2062-BTP	DIODE	
D885	MA2062-BTP	DIODE	
D886	MA2C165001VT	DIODE	
D887	B0JCME000025	DIODE SCHOTTKY BARRIER	
D888	B0JCME000025	DIODE SCHOTTKY BARRIER	
D891	MAZ30330LL	DIODE ZENER	
D902	MA2C18800E	DIODE	
D933	MA2C18800E	DIODE	
D953	B0ZAZ0000047	DIODE	
D962	MA2C18800E	DIODE	
D973	B0ZAZ0000047	DIODE	
D983	B0ZAZ0000047	DIODE	
D1502	B0HACW000001	DIODE FAST RECOVERY	
D1503	MAZ30300LL	DIODE ZENER	
D1504	B0HACW000001	DIODE FAST RECOVERY	
D1505	MA2C0290BF	DIODE	
D1506	MAZ30510ML	DIODE ZENER	
D1507	MAZ30300LL	DIODE ZENER	
D1510	MAZ30300LL	DIODE ZENER	
D1599	MA3X152K0L	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D2301	MA3X152K0L	DIODE / PT-53TW54J	
D2302	MA3X152K0L	DIODE	
D2303	MAZ30510HL	DIODE ZENER	
D2304	MAZ30510HL	DIODE ZENER / PT-53TW54J	
D2305	MAZ30510HL	DIODE ZENER / PT-53TW54J	
D2306	MA3X152K0L	DIODE	
D2307	MA3X152K0L	DIODE	
D2310	MA2C165001VT	DIODE / PT-53TW54J	
D2311	MA2C165001VT	DIODE / PT-53TW54J	
D2330	MA3X152K0L	DIODE / PT-47X54J	
D2331	MA3X152K0L	DIODE / PT-47X54J	
D2334	MA2C165001VT	DIODE / PT-47X54J	
D3301	MAZ31100ML	DIODE ZENER	
D3302	MAZ31100ML	DIODE ZENER	
D3304	MAZ31100ML	DIODE ZENER	
D3306	MAZ31100ML	DIODE ZENER	
D3307	MAZ31100ML	DIODE ZENER	
D3308	MAZ31100ML	DIODE ZENER	
D3309	MAZ31100ML	DIODE ZENER	
D3310	MAZ31100ML	DIODE ZENER	
D3312	MAZ31100ML	DIODE ZENER	
D3314	MAZ31100ML	DIODE ZENER	
D3316	MAZ31100ML	DIODE ZENER	
D3317	MAZ31100ML	DIODE ZENER	
D3318	MAZ31100ML	DIODE ZENER	
D3319	MAZ31100ML	DIODE ZENER	
D3320	MAZ31100ML	DIODE ZENER	
D3321	MAZ31100ML	DIODE ZENER	
D3322	MAZ31100ML	DIODE ZENER	
D3323	MAZ31100ML	DIODE ZENER	
D3324	MAZ31100ML	DIODE ZENER	
D3325	MAZ31100ML	DIODE ZENER	
D3326	MAZ31100ML	DIODE ZENER	
D3328	MAZ31100ML	DIODE ZENER	
D3329	MAZ31100ML	DIODE ZENER	
D3330	MAZ31100ML	DIODE ZENER	
D3332	CVS20A120MTA	DIODE	
D3334	CVS20A120MTA	DIODE	
D3335	MAZ31100ML	DIODE ZENER	
D3336	MAZ31100ML	DIODE ZENER	
D3339	MAZ31100ML	DIODE ZENER	
D3340	MAZ31100ML	DIODE ZENER	
D7060	MA3X152K0L	DIODE	
FUSES			
F801	K5D632AD0002	FUSE 6.3A/125V	
INTEGRATED CIRCUITS			
IC451	C1AA00000521	VERTICAL OUTPUT	
IC701	C0BBBA000043	EW, HHS ADJ. OP. AMPLIFIER	
IC801	AN8029	POWER SUPPLY	
IC802	C0EAS0000025	MAIN VOLTAGE DETECTOR	
IC805	AN78M12LB	12V REGULATOR	
IC811	0N3171RLF	OPTO COUPLER	
IC872	C0DACMG00001	9V REGULATOR	

Ref. No.	Part No.	Part Name & Description	Remarks
IC874	SI-8050J	5V REGULATOR	
IC875	C0DACMG00001	3.3V REGULATOR	
IC876	C0DACMG00001	2.5V REGULATOR	
IC877	C0DACMG00001	1.8V REGULATOR	
IC880	AN78M12LB	12V REGULATOR	
IC1302	TVR2AJ200S	MAIN EEPROM	
IC1303	TVR2AJ199S	CONVERGENCE EEPROM	
IC1501	C0ABBA000073	EHT AD. OPERATIONAL AMPLIFIER	
IC2201	AN5849S-E1V	MTS AUDIO	
IC2301	C1AA00000645	AUDIO AMPLIFIER	
IC2302	C1AA00000645	AUDIO AMPLIFIER / PT-53TW54J	
IC2303	C0ABBA000073	VAO OPERATIONAL AMPLIFIER	
IC2401	C1BB00000772	BBE VIVA PROCESSOR / PT-53TW54J	
IC2401	NJW1164MPTE1	BBE PROCESSOR / PT-47X54J	
IC7001	C5AA00000196	CONVERGENCE AMPLIFIER	
IC7002	C5AA00000196	CONVERGENCE AMPLIFIER	
COILS			
L001	ELELN330JA	COIL PEAKING 33UH	
L002	ELELN330JA	COIL PEAKING 33UH	
L301	ELEBD101KA	COIL PEAKING 100UH	
L302	ELESN100JA	COIL PEAKING 10UH	
L302	ELESN6R8JA	COIL PEAKING 6.8UH	
L303	ELESN6R8JA	COIL PEAKING 6.8UH	
L304	ELESN4R7JA	COIL PEAKING 4.7UH	
L307	ELEBD101KA	COIL PEAKING 100UH	
L331	ELESN100JA	COIL PEAKING 10UH	
L331	ELESN6R8JA	COIL PEAKING 6.8UH	
L332	ELESN6R8JA	COIL PEAKING 6.8UH	
L333	G0C560KA0021	COIL PEAKING 56UH	
L334	ELESN4R7KA	COIL PEAKING 4.7UH	
L335	ELEBD101KA	COIL PEAKING 100UH	
L337	G0C560KA0021	COIL PEAKING 56UH	
L341	ELEBD101KA	COIL PEAKING 100UH	
L361	ELEBD101KA	COIL PEAKING 100UH	
L362	ELESN100JA	COIL PEAKING 10UH	
L363	ELESN150JA	COIL PEAKING 15UH	
L364	ELESN4R7JA	COIL PEAKING 4.7UH	
L366	ELEBD101KA	COIL PEAKING 100UH	
L500	TALL08TR82MA	COIL	
L501	EXCELSA35T	FERRITE BEAD	
L510	EXCELD25V	FERRITE BEAD	
L511	EXCELD25V	FERRITE BEAD	
L515	EXCELD25V	FERRITE BEAD	
L516	EXCELD25V	FERRITE BEAD	
L555	ELH5L718	COIL LINEARITY	
L701	ELESN100KA	COIL PEAKING 10UH	
L702	EXCELSA35T	FERRITE BEAD	
L703	ELC18B152L	COIL CHOKE	
L704	ELC18B151G	COIL CHOKE 150UH	
L805	EXCELD25V	FERRITE BEAD	
L806	EXCELD25V	FERRITE BEAD	
L808	EXCELD35V	FERRITE BEAD	
L810	EXCELD25V	FERRITE BEAD	
L811	EXCELD25V	FERRITE BEAD	

Ref. No.	Part No.	Part Name & Description	Remarks
L815	EXCELSA39E	FERRITE BEAD	
L815	EXCELSA39V	FERRITE BEAD	
L816	EXCELSA39E	FERRITE BEAD	
L816	EXCELSA39V	FERRITE BEAD	
L817	TALL08T680KA	COIL	
L818	TALL08T680KA	COIL	
L819	EXCELD35V	FERRITE BEAD	
L820	EXCELD35V	FERRITE BEAD	
L821	EXCELD35V	FERRITE BEAD	
L825	TALL08T330KA	COIL	
L826	TALL08T330KA	COIL	
L827	TALL08T330KA	COIL	
L880	TALL08T220KA	COIL	
L881	TALL08T221KA	COIL	
L882	TALL08T220KA	COIL	
L883	G0ZZ00001909	INT CKT	
L884	TALFP15B151K	LINE FILTER	
L885	G0ZZ00001909	INT CKT	
L886	G0A101E00003	COIL LINE CHOKE	
L887	G0A101E00003	COIL LINE CHOKE	
L888	G0A470F00004	COIL LINE CHOKE	
L889	TALL08T221KA	COIL	
L890	TALL08T221KA	COIL	
L892	G0ZZ00001909	INT CKT	
L893	G0ZZ00001909	INT CKT	
L894	G0A101E00003	COIL LINE CHOKE	
L895	G0A101E00003	COIL LINE CHOKE	
L901	EXCELSA35T	FERRITE BEAD	
L902	EXCELSA35T	FERRITE BEAD	
L903	EXCELSA35T	FERRITE BEAD	
L933	EXCELSA35T	FERRITE BEAD	
L934	EXCELSA35T	FERRITE BEAD	
L935	EXCELSA35T	FERRITE BEAD	
L961	EXCELSA35T	FERRITE BEAD	
L962	EXCELSA35T	FERRITE BEAD	
L963	EXCELSA35T	FERRITE BEAD	
L1301	EXCELSA35T	FERRITE BEAD	
L1302	EXCELSA39V	FERRITE BEAD	
L1303	EXCELSA39V	FERRITE BEAD	
L1304	EXCELSA39V	FERRITE BEAD	
L1305	EXCELSA39V	FERRITE BEAD	
L1306	EXCELSA39V	FERRITE BEAD	
L2201	ELESN100JA	COIL PEAKING 10UH	
L2309	EXCELD35V	FERRITE BEAD / PT-53TW54J	
L2310	EXCELD35V	FERRITE BEAD	
L2311	ELC12E390L	COIL CHOKE 39UH	
L2312	ELC12E390L	COIL CHOKE 39UH / PT-53TW54J	
L2313	EXCELD35V	FERRITE BEAD / PT-53TW54J	
L2314	EXCELD35V	FERRITE BEAD	
L2315	ELC12E390L	COIL CHOKE 39UH	
L2316	ELC12E390L	COIL CHOKE 39UH / PT-53TW54J	
L2317	TALL08T330KA	COIL	
L2318	TALL08T330KA	COIL	
L2354	EXCELSA35T	FERRITE BEAD / PT-47X54J	

Ref. No.	Part No.	Part Name & Description	Remarks
L2355	EXCELSA35T	FERRITE BEAD / PT-47X54J	
L7001	EXCELSA39V	FERRITE BEAD	
L7002	EXCELSA39V	FERRITE BEAD	
L7003	EXCELSA39V	FERRITE BEAD	
L7004	EXCELSA39V	FERRITE BEAD	
L7005	EXCELSA39V	FERRITE BEAD	
L7006	EXCELSA39V	FERRITE BEAD	
LF801	ELF21N035A	COIL LINE FILTER	
LF801	ELF24V037A	COIL LINE FILTER	
LF803	ELF21N035A	COIL LINE FILTER	
TRANSISTORS			
Q301	2SC1473ATA	TRANSISTOR	
Q302	2SC3526H	TRANSISTOR	
Q303	2SC1473ATA	TRANSISTOR	
Q304	2SA1309ATA	TRANSISTOR	
Q325	2SC3311ATA	TRANSISTOR	
Q331	2SC3526H	TRANSISTOR	
Q332	2SA1309ATA	TRANSISTOR	
Q353	2SC3942LB	TRANSISTOR	
Q354	B1BAAN000025	TRANSISTOR	
Q355	B1BCAN000004	TRANSISTOR	
Q362	2SC3311ATA	TRANSISTOR	
Q363	2SC3526H	TRANSISTOR	
Q364	2SA1309ATA	TRANSISTOR	
Q365	2SC3311ATA	TRANSISTOR	
Q366	2SC3311ATA	TRANSISTOR	
Q367	2SA1309ATA	TRANSISTOR	
Q368	2SA1309ATA	TRANSISTOR	
Q373	2SC3942LB	TRANSISTOR	
Q374	B1BAAN000025	TRANSISTOR	
Q375	B1BCAN000004	TRANSISTOR	
Q376	2SC3311ATA	TRANSISTOR	
Q393	2SC3942LB	TRANSISTOR	
Q394	B1BAAN000025	TRANSISTOR	
Q395	B1BCAN000004	TRANSISTOR	
Q397	2SC3311ATA	TRANSISTOR	
Q406	2PD601AR-115	TRANSISTOR	
Q501	B1CEML000001	TRANSISTOR	
Q509	2SC1473QRTA	TRANSISTOR	
Q510	2SC1473QRTA	TRANSISTOR	
Q512	2PD601AR-115	TRANSISTOR	
Q513	2PD601AR-115	TRANSISTOR	
Q551	B1BAJW000001	TRANSISTOR	
Q606	2PD601AR-115	TRANSISTOR	
Q701	2SK2538000LB	TRANSISTOR	
Q801	2SK2917LB	TRANSISTOR	
Q802	2PD601AR-115	TRANSISTOR	
Q803	2PB709AR-115	TRANSISTOR	
Q854	2SA19610QAHW	TRANSISTOR	
Q881	UN2214TX	TRANSISTOR	
Q882	UN2115TX	TRANSISTOR	
Q883	UN2215TX	TRANSISTOR	
Q901	2SB1321ARA	TRANSISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
Q903	2SA1309ATA	TRANSISTOR	
Q904	2SD1992ARA	TRANSISTOR	
Q905	2SC3311ATA	TRANSISTOR	
Q906	2SC3311ATA	TRANSISTOR	
Q907	2SA1309ATA	TRANSISTOR	
Q908	2SC3311ATA	TRANSISTOR	
Q934	2SA1309ATA	TRANSISTOR	
Q935	2SC3311ATA	TRANSISTOR	
Q936	2SC3311ATA	TRANSISTOR	
Q937	2SA1309ATA	TRANSISTOR	
Q938	2SB1321ARA	TRANSISTOR	
Q941	2SD1992ARA	TRANSISTOR	
Q951	2SC3311ATA	TRANSISTOR	
Q952	2SC3311ATA	TRANSISTOR	
Q953	2SC3311ATA	TRANSISTOR	
Q955	2SA1248SRA	TRANSISTOR	
Q956	2SC3116SRA	TRANSISTOR	
Q957	2SA1248SRA	TRANSISTOR	
Q958	2SC3116SRA	TRANSISTOR	
Q959	2SA1248SRA	TRANSISTOR	
Q960	2SC3116SRA	TRANSISTOR	
Q961	2SB1321ARA	TRANSISTOR	
Q962	2SC3311ATA	TRANSISTOR	
Q964	2SD1992ARA	TRANSISTOR	
Q965	2SA1309ATA	TRANSISTOR	
Q966	2SC3311ATA	TRANSISTOR	
Q967	2SC3311ATA	TRANSISTOR	
Q968	2SA1309ATA	TRANSISTOR	
Q1503	2SA1309ATA	TRANSISTOR	
Q1504	B1BAAV000003	TRANSISTOR	
Q1505	2SC3311ATA	TRANSISTOR	
Q2301	UN2215TX	TRANSISTOR	
Q2302	2PB709AR-115	TRANSISTOR	
Q2303	2PD601AR-115	TRANSISTOR	
Q2304	2PB709AR-115	TRANSISTOR	
Q2305	UN2115TX	TRANSISTOR	
Q2306	UNR221600L	TRANSISTOR	
Q2307	UNR221600L	TRANSISTOR	
Q2308	2PD601AR-115	TRANSISTOR	
Q2309	2PD601AR-115	TRANSISTOR	
Q2350	UNR221600L	TRANSISTOR / PT-47X54J	
Q2352	2PB709AR-115	TRANSISTOR / PT-47X54J	
Q2358	UNR221600L	TRANSISTOR / PT-47X54J	
Q2451	2PD601AR-115	TRANSISTOR	
Q2452	2PD601AR-115	TRANSISTOR	
Q7006	2PD601AR-115	TRANSISTOR	
Q7007	2PD601AR-115	TRANSISTOR	
Q7060	2PB709AR-115	TRANSISTOR	
Q7061	2PD601AR-115	TRANSISTOR	
RELAYS			
RL801	K6B1ADA00010	RELAY	
RL802	K6B1ADA00010	RELAY	
RESISTORS			

Ref. No.	Part No.	Part Name & Description	Remarks
R001	ERJ6GEYJ101V	RES M 100-J-1/10W	
R002	ERJ6GEYJ101V	RES M 100-J-1/10W	
R004	ERJ6GEYJ101V	RES M 100-J-1/10W	
R005	ERJ6GEYJ101V	RES M 100-J-1/10W	
R008	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R009	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R010	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R013	ERG1SJ273P	RES M 27K-J-1W	
R015	ERG1SJ273P	RES M 27K-J-1W	
R072	ERDS2TJ101T	RES C 100-J-1/4W	
R073	ERDS2TJ471T	RES C 470-J-1/4W	
R080	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R081	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R082	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R083	ERDS2TJ512T	RES C 5.1K-J-1/4W	
R084	ERDS2TJ912T	RES C 9.1K-J-1/4W	
R086	ERDS2TJ681T	RES C 680-J-1/4W	
R087	ERDS2TJ331T	RES C 330-J-1/4W	
R088	ERDS2TJ123T	RES C 12K-J-1/4W / PT-53TW54J	
R088	ERDS2TJ392T	RES C 3.9K-J-1/4W / PT-47X54J	
R089	ERDS2TJ822T	RES C 8.2K-J-1/4W / PT-47X54J	
R301	ERDS1FJ394P	RES C 390K-J-1/2W	
R302	ERDS2TJ101T	RES C 100-J-1/4W	
R303	EROS2THF2200	RES M 220-F-1/4W	
R304	ERDS2TJ334T	RES C 330K-J-1/4W	
R305	EROS2THF2200	RES M 220-F-1/4W	
R306	EROS2THF1001	RES M 1K-F-1/4W	
R307	ERDS2TJ220T	RES C 22-J-1/4W	
R308	ERDS2TJ334T	RES C 330K-J-1/4W	
R310	ERDS2TJ562T	RES C 5.6K-J-1/4W	
R311	ERDS2TJ470T	RES C 47-J-1/4W	
R312	ERG7ZJ272	RES M 2.7K-J-7W	
R313	ERDS2TJ151T	RES C 150-J-1/4W	
R315	ERDS2TJ563T	RES C 56K-J-1/4W	
R316	ERDS2TJ821T	RES C 820-J-1/4W	
R317	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R318	ERDS2TJ681T	RES C 680-J-1/4W	
R319	ERG12SJ101P	RES M 100-J-1W	
R320	ERDS1FJ330P	RES C 33-J-1/2W	
R321	ERDS1FJ330P	RES C 33-J-1/2W	
R322	ERG12SJ101P	RES M 100-J-1W	
R323	ERDS2TJ470T	RES C 47-J-1/4W	
R325	ERDS2TJ473T	RES C 47K-J-1/4W	
R325	ERDS2TJ681T	RES C 680-J-1/4W	
R326	ERDS2TJ101T	RES C 100-J-1/4W	
R327	ERC12GK331D	RES C 330-K-1/2W	
R328	ERDS1TJ104T	RES C 100K-J-1/2W	
R329	ERDS1FJ103T	RES C 10K-J-1/2W	
R331	EROS2THF2200	RES M 220-F-1/4W	
R332	ERDS2TJ101T	RES C 100-J-1/4W	
R333	EROS2THF2200	RES M 220-F-1/4W	
R334	ERDS2TJ220T	RES C 22-J-1/4W	
R335	EROS2THF1001	RES M 1K-F-1/4W	
R337	ERDS2TJ151T	RES C 150-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R338	ERDS2TJ681T	RES C 680-J-1/4W	
R341	ERDS2TJ101T	RES C 100-J-1/4W	
R344	ERG7ZJ272	RES M 2.7K-J-7W	
R345	ERDS2TJ470T	RES C 47-J-1/4W	
R346	ERDS2TJ470T	RES C 47-J-1/4W	
R348	ERDS2TJ563T	RES C 56K-J-1/4W	
R349	ERDS2TJ821T	RES C 820-J-1/4W	
R350	ERG12SJ101P	RES M 100-J-1W	
R351	ERDS1FJ330P	RES C 33-J-1/2W	
R352	ERDS1FJ330P	RES C 33-J-1/2W	
R353	ERG12SJ101P	RES M 100-J-1W	
R354	ERDS2TJ473T	RES C 47K-J-1/4W	
R354	ERDS2TJ681T	RES C 680-J-1/4W	
R355	ERDS1FJ103T	RES C 10K-J-1/2W	
R356	ERC12GK331D	RES C 330-K-1/2W	
R357	ERDS1TJ104T	RES C 100K-J-1/2W	
R360	ERDS2TJ470T	RES C 47-J-1/4W	
R363	ERDS2TJ220T	RES C 22-J-1/4W	
R365	ERDS2TJ221T	RES C 220-J-1/4W	
R366	ERDS2TJ101T	RES C 100-J-1/4W	
R367	EROS2THF2200	RES M 220-F-1/4W	
R368	EROS2THF2200	RES M 220-F-1/4W	
R369	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R370	EROS2THF1470	RES M 1.47K-F-1/4W	
R371	EROS2THF1001	RES M 1K-F-1/4W	
R372	EROS2THF82R0	RES M 82.0-F-1/4W	
R374	ERDS2TJ151T	RES C 150-J-1/4W	
R375	ERDS2TJ470T	RES C 47-J-1/4W	
R378	ERDS2TJ101T	RES C 100-J-1/4W	
R379	ERDS2TJ563T	RES C 56K-J-1/4W	
R380	ERDS2TJ821T	RES C 820-J-1/4W	
R382	ERDS1FJ103T	RES C 10K-J-1/2W	
R383	ERG12SJ101P	RES M 100-J-1W	
R384	ERDS1FJ330P	RES C 33-J-1/2W	
R385	ERDS1FJ330P	RES C 33-J-1/2W	
R386	ERG12SJ101P	RES M 100-J-1W	
R387	ERG7ZJ272	RES M 2.7K-J-7W	
R389	ERDS2TJ473T	RES C 47K-J-1/4W	
R390	ERC12GK331D	RES C 330-K-1/2W	
R391	ERDS1TJ104T	RES C 100K-J-1/2W	
R392	EROS2THF8201	RES M 8.2K-F-1/4W	
R393	EROS2THF5101	RES M 5.1K-F-1/4W	
R393	EROS2THF8201	RES M 8.2K-F-1/4W	
R394	EROS2THF9760	RES M 976-F-1/4W	
R395	ERDS2TJ221T	RES C 220-J-1/4W	
R396	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R397	EROS2THF1201	RES M 1.2K-F-1/4W	
R398	EROS2THF3300	RES M 330-F-1/4W	
R408	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R409	ERDS2TJ563T	RES C 56K-J-1/4W	
R410	ERJ6GEYJ224V	RES M 220K-J-1/10W	
R411	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R412	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R415	ERG3FJ331H	RES M 330-J-3W	

Ref. No.	Part No.	Part Name & Description	Remarks
R421	ERJ6ENF2702V	RES M 27K-F-1/10W	
R422	ERJ6ENF82R0V	RES M 82-F-1/10W	
R423	ERJ6ENF5601V	RES M 5.6K-F-1/10W	
R425	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R426	ERJ6ENF1502V	RES M 15K-F-1/10W	
R428	ERJ6ENF1502V	RES M 15K-F-1/10W	
R434	ERX12SJ1R8V	RES M 1.8-J-1/2W	
R435	ERX12SJ1R8V	RES M 1.8-J-1/2W	
R464	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R465	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R466	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R470	ERDS2TJ331T	RES C 330-J-1/4W	
R471	ERDS2TJ331T	RES C 330-J-1/4W	
R472	ERDS2TJ331T	RES C 330-J-1/4W	
R501	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R502	ERJ6GEYJ680V	RES M 68-J-1/10W	
R503	ERG2FJ180H	RES M 18-J-2W	
R504	ERG3FJ271H	RES M 270-J-3W	
R505	ERG1SJ120P	RES M 12-J-1W	
R506	ERX1SJR47P	RES M .47-J-1W	
R512	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R513	ERDS2TJ471T	RES C 470-J-1/4W	
R514	EROS2THF5602	RES M 56K-F-1/4W	
R515	EROS2THF4642	RES M 45.4K 1/4W	
R516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R517	EROS2THF2002	RES M 20K-F-1/4W	
R518	ERX12SJR22V	RES M .22-J-1/2W	
R519	ERQ12HJR22P	RES F .22-K-1/2W	
R520	ERQ12HJ330P	RES F 33-J-1/2W	
R521	EROS2THF2612	RES M 26.1K-F-1/4W	
R522	EROS2THF7151	RES M 7.15K-F-1/4W	
R523	ERDS2TJ275T	RES C 2.7MEG-J-1/4W	
R524	EROS2THF2002	RES M 20K-F-1/4W	
R525	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R534	EROS2THF1203	RES M 120K-F-1/4W	
R535	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R541	ERDS2TJ563T	RES C 56K-J-1/4W	
R550	EROS2THF1002	RES M 10K-F-1/4W	
R560	ERJ6GEYJ101V	RES M 100-J-1/10W	
R561	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R562	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R621	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R622	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R624	ERJ6GEYJ101V	RES M 100-J-1/10W	
R643	ERJ6GEYJ101V	RES M 100-J-1/10W	
R653	ERDS2TJ101T	RES C 100-J-1/4W	
R654	ERDS2TJ184T	RES C 180K-J-1/4W	
R655	ERDS2TJ184T	RES C 180K-J-1/4W	
R656	ERDS2TJ124T	RES C 120K-J-1/4W	
R704	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R706	ERDS1FJ680T	RES C 68-J-1/2W	
R708	ERF5AK4R7H	RES W 4.7-K-5W	
R800	D1F53R3EA001	RES M 3.3-1/2W	



Ref. No.	Part No.	Part Name & Description	Remarks
R805	ERDS2TJ101T	RES C 100-J-1/4W	
R808	ERX12SZJR12P	RES M .12-J-1/2W	
R809	ERJ6GEYJ225V	RES M 2.2M-J-1/10W	
R810	ERX12SZJR12P	RES M .12-J-1/2W	
R811	ERX12SZJR12P	RES M .12-J-1/2W	
R812	ERDS2TJ103T	RES C 10K-J-1/4W	
R813	ERDS1FJ561T	RES C 560-J-1/2W	
R814	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R815	ERJ6GEYJ301V	RES M 300-J-1/10W	
R816	ERDS2TJ471T	RES C 470-J-1/4W	
R817	ERJ6ENF2001V	RES M 2K-F-1/10W	
R818	ERDS1FJ100T	RES C 10-J-1/2W	
R820	ERDS1FJ470T	RES C 47-J-1/2W	
R822	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R832	ERD75TAJ825	RES C 8.2MEG-J-3/4W	
R833	ERJ6GEYJ101V	RES M 100-J-1/10W	
R835	ERDS2TJ101T	RES C 100-J-1/4W	
R836	ERJ6GEYJ101V	RES M 100-J-1/10W	
R839	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R840	ERJ6GEYJ101V	RES M 100-J-1/10W	
R846	ERDS2TJ223T	RES C 22K-J-1/4W	
R847	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R857	ERX1SJ1R0P	RES M 1.0-J-1W	
R858	ERX1SJ1R0P	RES M 1.0-J-1W	
R859	ERDS2TJ103T	RES C 10K-J-1/4W	
R860	ERDS1FJ222T	RES C 2200-J-1/2W	
R862	ERG3FJ333H	RES M 33K-J-3W	
R865	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R866	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R867	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R870	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R871	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R872	ERJ6GEYJ333V	RES M 33K-J-1/10W	
R873	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R874	ERJ6GEYJ102V	RES M 1K-J-1/10W / PT-47X54J	
R874	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R875	ERJ6ENF6191V	RES M 6190-F-1/10W	
R876	ERJ6ENF33R0V	RES M 33.OK-F-1/10W	
R877	ERJ6ENF1781V	RES M 1.78K-F-1/10W	
R878	ERJ6ENF1001V	RES M 1K-F-1/10W	
R879	ERJ6ENF1001V	RES M 1K-F-1/10W	
R880	ERJ6ENF1001V	RES M 1K-F-1/10W	
R881	ERDS1TJ560T	RES C 56-J-1/2W	
R882	ERJ6ENF9530V	RES M 953-F-1/10W	
R883	ERJ6ENF6340V	RES M 634-F-1/10W	
R885	ERJ6ENF1001V	RES M 1K-F-1/10W	
R886	ERJ6ENF1001V	RES M 1K-F-1/10W	
R901	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R902	ERDS2TJ103T	RES C 10K-J-1/4W	
R903	ERDS2TJ683T	RES C 68K-J-1/4W	
R904	ERDS2TJ683T	RES C 68K-J-1/4W	
R905	ERDS2TJ103T	RES C 10K-J-1/4W	
R906	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R907	ERDS1FVJ470T	RES C 47-J-1/2W	

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Ref. No.	Part No.	Part Name & Description	Remarks
R908	ERDS1FVJ470T	RES C 47-J-1/2W	
R909	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R910	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R911	ERG3SJS221H	RES M 220-J-3W	
R912	ERDS2TJ101T	RES C 100-J-1/4W	
R913	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R914	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R915	ERQ14AJ220P	RES F 22-J-1/4W	
R916	ERQ14AJ220P	RES F 22-J-1/4W	
R917	ERQ14AJ100P	RES F 10-J-1/4W	
R918	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R919	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R920	ERDS2TJ681T	RES C 680-J-1/4W	
R921	ERDS2TJ151T	RES C 150-J-1/4W	
R925	ERDS2TJ151T	RES C 150-J-1/4W	
R926	ERDS2TJ151T	RES C 150-J-1/4W	
R928	ERQ14AJ220P	RES F 22-J-1/4W	
R929	ERDS2TJ101T	RES C 100-J-1/4W	
R940	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R941	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R942	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R943	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R944	ERDS2TJ681T	RES C 680-J-1/4W	
R945	ERDS2TJ681T	RES C 680-J-1/4W	
R946	ERQ14AJ100P	RES F 10-J-1/4W	
R947	ERQ14AJ220P	RES F 22-J-1/4W	
R948	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R949	ERDS2TJ103T	RES C 10K-J-1/4W	
R950	ERDS2TJ683T	RES C 68K-J-1/4W	
R951	ERDS2TJ683T	RES C 68K-J-1/4W	
R952	ERDS2TJ103T	RES C 10K-J-1/4W	
R953	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R954	ERDS1FVJ470T	RES C 47-J-1/2W	
R955	ERDS1FVJ470T	RES C 47-J-1/2W	
R956	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R957	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R958	ERG3SJS221H	RES M 220-J-3W	
R959	ERDS2TJ681T	RES C 680-J-1/4W	
R961	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R962	ERDS2TJ103T	RES C 10K-J-1/4W	
R963	ERDS2TJ683T	RES C 68K-J-1/4W	
R964	ERDS2TJ683T	RES C 68K-J-1/4W	
R965	ERDS2TJ103T	RES C 10K-J-1/4W	
R966	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R967	ERDS1FVJ470T	RES C 47-J-1/2W	
R968	ERDS1FVJ470T	RES C 47-J-1/2W	
R969	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R970	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R971	ERG3SJS221H	RES M 220-J-3W	
R972	ERDS2TJ101T	RES C 100-J-1/4W	
R973	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R974	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R975	ERQ14AJ100P	RES F 10-J-1/4W	
R976	ERQ14AJ220P	RES F 22-J-1/4W	



Ref. No.	Part No.	Part Name & Description	Remarks
R977	ERDS2TJ151T	RES C 150-J-1/4W	
R978	ERQ14AJ220P	RES F 22-J-1/4W	
R979	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R980	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R981	ERDS2TJ681T	RES C 680-J-1/4W	
R1322	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1323	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1324	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1325	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1326	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1327	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1329	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1330	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1331	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1332	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1338	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R1502	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R1503	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1504	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1505	EROS2THF1331	RES M 1.33K-F-1/4W	
R1506	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1507	ERG3SJD152L	RES M 1.5K-J-3W	
R1508	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R1508	ERJ6GEYJ242V	RES M 2.4K-J-1/10W	
R1509	ERDS2TJ102T	RES C 1K-J-1/4W	
R1510	ERG2SJD333L	RES M 33K-J-2W	
R1511	ERG2SJD333L	RES M 33K-J-2W	
R1512	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1514	ERG2SJD333L	RES M 33K-J-2W	
R1515	ERJ6ENF1001V	RES M 1K-F-1/10W	
R1516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1517	ERJ6ENF3571V	RES M 3.57K-F-1/10W	
R1518	ERG2SJD333L	RES M 33K-J-2W	
R1519	ERDS2TJ101T	RES C 100-J-1/4W	
R1520	ERDS2TJ221T	RES C 220-J-1/4W	
R1521	EROS2THF1500	RES M 150-F-1/4W	
R1522	ERC12GK103D	RES C 10K-K-1/2W	
R1523	ERDS2TJ104T	RES C 100K-J-1/4W	
R1524	EROS2THF1401	RES M 1.4K-F-1/4W	
R1527	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1528	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R1529	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R1532	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1542	ERG2SJD333L	RES M 33K-J-2W	
R1544	ERJ6GEYJ471V	RES M 470-J-1/10W	
R1546	ERJ6GEYJ221V	RES M 220-J-1/10W	
R1599	ERJ6ENF9761V	RES M 9760-F-1/10W	
R2201	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R2202	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2203	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2204	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2301	ERJ6GEYJ472V	RES M 4.7K-J-1/10W / PT-53TW54J	
R2302	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2305	ERJ6ENF1201V	RES M 1.2K-F-1/10W / PT-53TW54J	

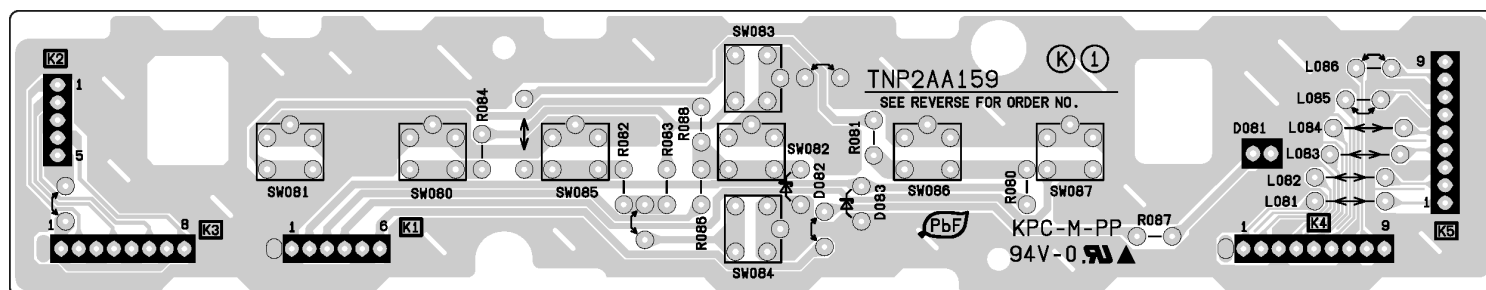
Ref. No.	Part No.	Part Name & Description	Remarks
R2306	ERJ12YJ101U	RES M 100-J-1/2W / PT-53TW54J	
R2307	ERJ6ENF1001V	RES M 1K-F-1/10W / PT-53TW54J	
R2307	ERJ6ENF1501V	RES M 1.5K-F-1/10W / PT-47X54J	
R2308	ERJ6ENF5362V	RES M 53.6K-F-1/10W PT-53TW54J	
R2309	ERJ12YJ101U	RES M 100-J-1/2W	
R2310	ERJ6ENF5232V	RES M 5.32K-F-1/10W / PT-47X54J	
R2310	ERJ6ENF5362V	RES M 53.6K-F-1/10W	
R2311	ERJ6ENF5601V	RES M 5.6K-F-1/10W / PT-53TW54J	
R2312	ERDS2TJ472T	RES C 4.7K-J-1/4W / PT-47X54J	
R2312	ERJ6ENF5601V	RES M 5.6K-F-1/10W / PT-53TW54J	
R2313	ERJ6GEYJ103V	RES M 10K-J-1/10W / PT-53TW54J	
R2314	ERJ6GEYJ683V	RES M 68K-J-1/10W / PT-53TW54J	
R2315	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2316	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2317	ERJ6ENF1201V	RES M 1.2K-F-1/10W / PT-53TW54J	
R2318	ERJ6GEYJ223V	RES M 22K-J-1/10W / PT-53TW54J	
R2319	ERJ6ENF1202V	RES.M 1.2K-F-1/10W / PT-53TW54J	
R2320	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2321	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2322	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2323	ERJ6ENF1303V	RES M 130K-F-1/10W / PT-53TW54J	
R2324	ERJ6ENF1303V	RES M 130K-F-1/10W	
R2325	ERJ6GEYJ223V	RES M 22K-J-1/10W / PT-53TW54J	
R2326	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2327	ERJ6ENF1202V	RES.M 1.2K-F-1/10W / PT-53TW54J	
R2328	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2329	ERJ6ENF1201V	RES M 1.2K-F-1/10W / PT-53TW54J	
R2330	ERJ6GEYJ683V	RES M 68K-J-1/10W / PT-53TW54J	
R2331	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2332	ERJ6ENF5601V	RES M 5.6K-F-1/10W / PT-53TW54J	
R2333	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2334	ERDS2TJ472T	RES C 4.7K-J-1/4W / PT-47X54J	
R2334	ERJ6ENF5601V	RES M 5.6K-F-1/10W / PT-53TW54J	
R2335	ERJ6ENF5362V	RES M 53.6K-F-1/10W / PT-53TW54J	
R2336	ERJ6ENF5232V	RES M 5.32K-F-1/10W / PT-47X54J	
R2336	ERJ6ENF5362V	RES M 53.6K-F-1/10W PT-53TW54J	
R2337	ERJ6ENF1001V	RES M 1K-F-1/10W / PT-53TW54J	
R2337	ERJ6ENF1501V	RES M 1.5K-F-1/10W / PT-47X54J	
R2338	ERJ12YJ101U	RES M 100-J-1/2W / PT-53TW54J	
R2339	ERJ12YJ101U	RES M 100-J-1/2W	
R2340	ERJ6ENF1201V	RES M 1.2K-F-1/10W / PT-53TW54J	
R2341	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2342	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2343	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2344	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2345	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2346	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2347	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2348	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2349	ERJ6GEYJ271V	RES M 270-J-1/10W	
R2350	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2351	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2352	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R2353	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2354	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2356	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R2357	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2358	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2359	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2360	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2361	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2362	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2363	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2364	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2365	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2366	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2367	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2378	ERJ6ENF1501V	RES M 1.5K-F-1/10W / PT-47X54J	
R2380	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / PT-47X54J	
R2391	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / PT-47X54J	
R2420	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / PT-47X54J	
R2432	ERJ6ENF1501V	RES M 1.5K-F-1/10W / PT-47X54J	
R2434	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / PT-47X54J	
R2451	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2452	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2453	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2454	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2455	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2456	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2457	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2458	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R2459	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2460	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2461	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R3201	ERJ6GEYJ750V	RES M 75-J-1/10W	
R3202	ERJ6GEYJ750V	RES M 75-J-1/10W	
R3301	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3302	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3303	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3304	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3305	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3306	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3307	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3308	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3309	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3310	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3311	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3312	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3313	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3314	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3315	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3316	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3317	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3318	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3319	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3320	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3321	ERJ6GEYJ184V	RES M 180K-J-1/10W	

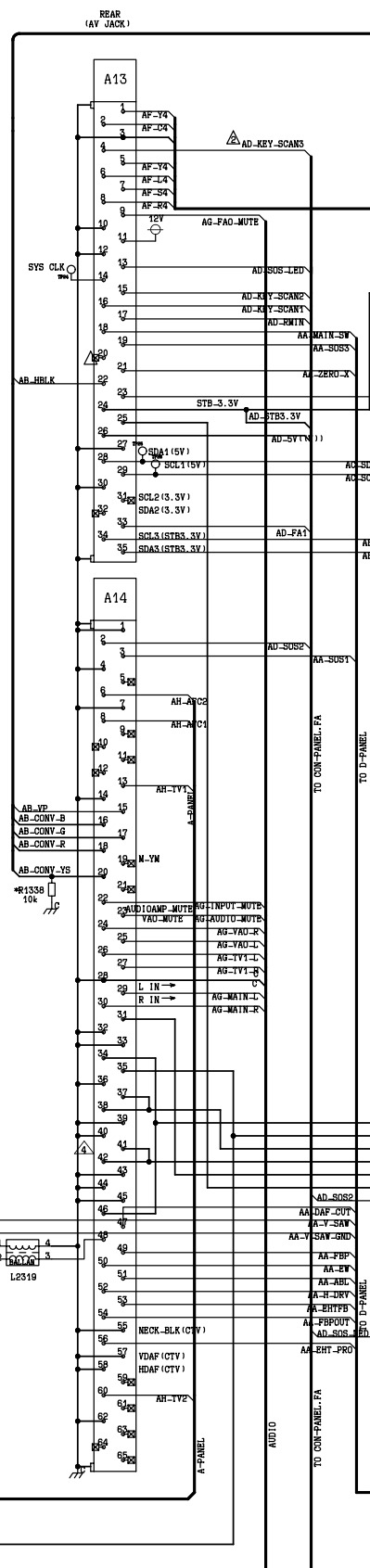
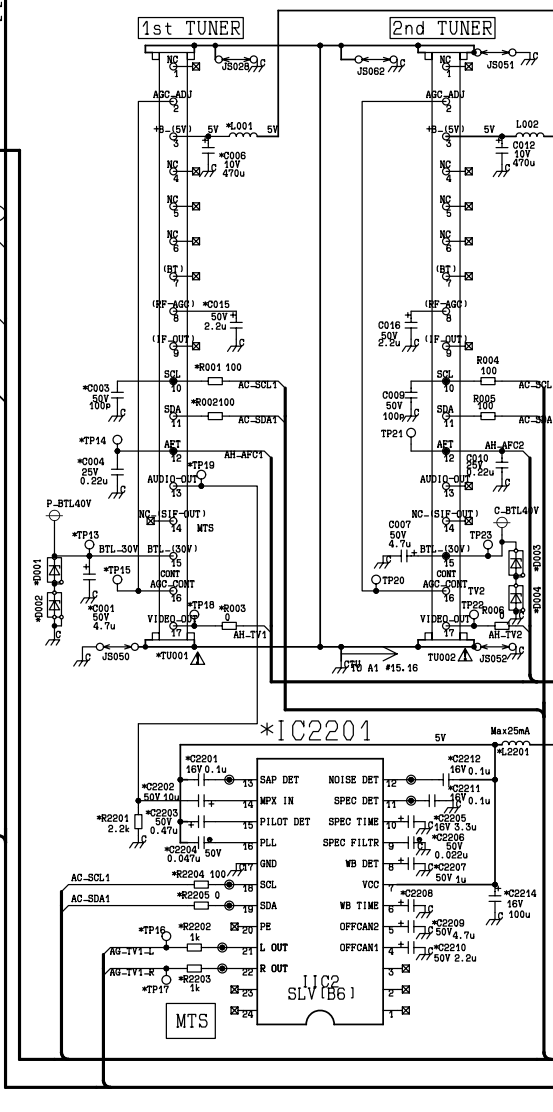
Ref. No.	Part No.	Part Name & Description	Remarks
R3322	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3323	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3324	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3326	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3327	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3328	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R7001	ERG2FJ820H	RES M 82-J-2W	
R7002	ERG2FJ121H	RES M 120-J-2W	
R7003	ERG2FJ820H	RES M 82-J-2W	
R7004	ERG2FJ121H	RES M 120-J-2W	
R7005	ERG2FJ820H	RES M 82-J-2W	
R7006	ERG2FJ121H	RES M 120-J-2W	
R7011	ERX2FJ2R2H	RES M 2.2-J-2W	
R7012	ERX2FJ2R2H	RES M 2.2-J-2W	
R7013	ERX2FJ2R2H	RES M 2.2-J-2W	
R7014	ERX2FJ2R2H	RES M 2.2-J-2W	
R7015	ERX2FJ2R2H	RES M 2.2-J-2W	
R7016	ERX2FJ2R2H	RES M 2.2-J-2W	
R7023	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7024	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7026	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7027	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7029	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7030	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7031	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7032	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7034	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7035	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7036	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7037	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7038	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7040	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7041	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7045	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7046	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7047	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7048	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7052	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7055	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7058	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7059	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R7060	ERX1SJR27P	RES M .27-J-1W	
R7061	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7062	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7063	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7064	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7065	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7066	ERX1SJR27P	RES M .27-J-1W	
SWITCHES			
SW080	EVQPBD05R	SWITCH	
SW081	EVQPBD05R	SWITCH	
SW082	EVQPBD05R	SWITCH	
SW083	EVQPBD05R	SWITCH	
SW084	EVQPBD05R	SWITCH	

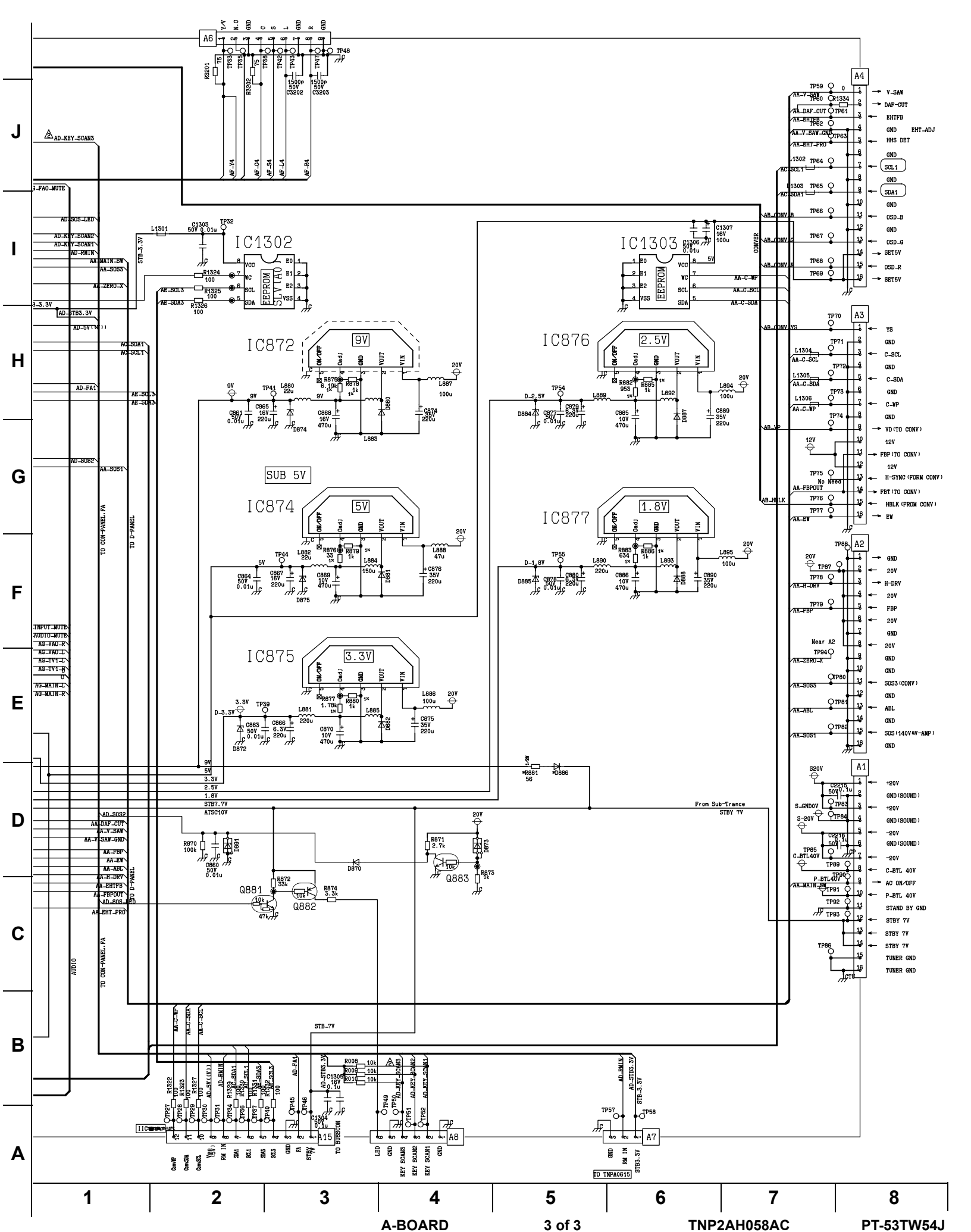
Ref. No.	Part No.	Part Name & Description	Remarks
SW085	EVQPBD05R	SWITCH	
SW086	EVQPBD05R	SWITCH	
SW087	EVQPBD05R	SWITCH	
SW088	EVQPBD05R	SWITCH / PT-47X54J	
TRANSFORMERS			
T501	ETH19K204AZ	TRANSFORMER	
T551	TLF2AA009	TRANSFORMER FLYBACK	⚠
T801	ETS42AD495AD	TRANSFORMER	⚠
T802	ETP30KB941JG	TRANSFORMER	⚠
CRYSTALS / FILTERS			
X1101	H0J400400025	CRYSTAL 4MHZ	
X4201	H0J202500011	CRYSTAL 20.2MHZ	
OTHERS			
TU001	ENG6302GF	TUNER	⚠
TU002	ENG36A08GF	SUB-TUNER	⚠
M001	TSX2AA0421	AC LINE CORD	⚠
1	TXFCRT41JSER	CRT (BLUE) / PT-47X54J	
	TXFCRT42JSER	CRT (GREEN) / PT-47X54J	
	TXFCRT43JSER	CRT (RED) / PT-47X54J	
	TXFCRT44JSER	CRT(BLUE) / PT-53TW54J	
	TXFCRT45JSER	CRT(GREEN) / PT-53TW54J	
	TXFCRT46JSER	CRT(RED) / PT-53TW54J	
M002	TJS2AC0051	CRT SOCKET	
2	KDY2ASF83F	DEFLECTION YOKE / PT-47X54J	⚠
M003	TXF3A01ECV	DAG GROUND	
3	TKG2AF020-1	A/B LENS / PT-47X54J	
	TKG2AF029	A/B LENS / PT-53TW54J	
4	TKG2AA50091	MIRROR GLASS / PT-47X54J	
	TKG2AA50121	MIRROR GLASS / PT-53TW54J	
5	TMW2AX0041B	MIRROR BRACKET (SIDE)	
6	TMW2AX0161	MIRROR BRACKET (TOP)	
M005	TKE2AA01002S	SCREEN FRAME / PT-47X54J	
M006	TKP2AA1142S	SCREEN FRAME COVER / PT-47X54J	
M007	TKG2AD00141	PROTECTIVE SCREEN 47" / PT-47X54J	
M008	TKG2AH50461	LENTICULAR SCREEN 47" / PT-47X54J	
M009	TKG2AH50681	SCREEN FRESNEL 47" / PT-47X54J	
7	TKG2AH50641	PROTECTIVE LENTICULAR SCREEN / PT-53TW54J	
8	TKG2AH50631	FRESNEL SCREEN / PT-53TW54J	
9	TKZ2AM50041D	SCREEN BRACKET / PT-53TW54J	
	TKZ2AM50181A	SCREEN BRACKET / PT-53TW54J	
10	TKY2AA3903S	CABINET FRONT / PT-53TW54J	
11	TKB2AA0231S	WOOD CABINET / PT-53TW54J	
M010	TKX2AA0221S	PLASTIC BASE / PT-47X54J	
12	TKU2AA03601	CABINET BACK LOWER / PT-53TW54J	
13	TKU2AA04002	BACK COVER (MIDDLE) / PT-53TW54J	
14	TKU2AC3101S	CABINET BACK / PT-53TW54J	
M011	TKU2AC4201S	LOWER BACK CABINET / PT-47X54J	
15	TKD2AX2831S	INNER BOARD / PT-47X54J	
16	EASG5PH508A2	SPEAKER (TWEETER) / PT-53TW54J	
	EAST6PH08P6	SPEAKER TWEETER / PT-47X54J	
17	EASG8P533A2	SPEAKER (MIDRANGE) / PT-53TW54J	

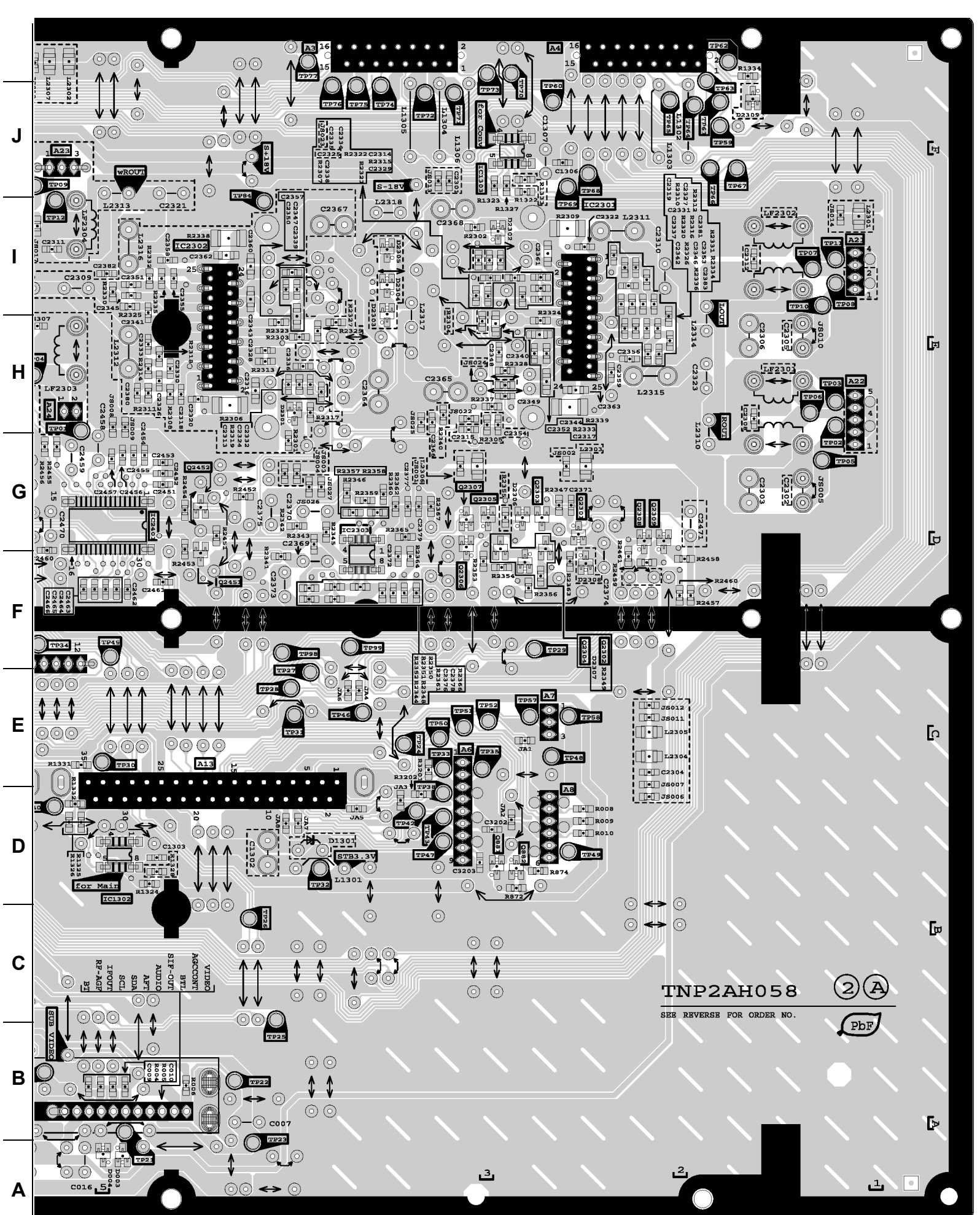
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<u>18</u>	EASG16P559A2	SPEAKER (WOOFER) / PT-53TW54J	
	EAST16P51A6	SPEAKER (WOOFER) / PT-47X54J	
<u>19</u>	TKP2AA1162S	SPEAKER GRILLE / PT-47X54J	
	TKP2AA0793S	SPEAKER GRILLE / PT-53TW54J	
M012	TKP2AA1101S	SPEAKER BASE COVER / PT-47X54J	
<u>20</u>	TLH2AH001	DISTRIBUTOR	
<u>21</u>	D9ZZ00000079	FOCUS PACK	
<u>22</u>	TXFKP08JSER	A/V REAR COVER	
<u>23</u>	TKD2AX5011S	FRONT BOARD PT-47X54J	
	TKD2AX0271S	FRONT BOARD / PT-53TW54J	
<u>24</u>	TXFKP12JSER	CONTROL PANEL / PT-53TW54J	
M013	TKP2AA1152S	FRONT COVER / PT-47X54J	
<u>25</u>	TXFKP06JSER	A/V POCKET / PT-53TW54J	
M014	TKP2AA0813S	PLASTIC DOOR / PT-53TW54J	
M015	TEK6935	LATCH / PT-53TW54J	
M016	TBX2AA0241	DISC BUTTON / PT-47X54J	
M017	TBX2AA0271	5-KEY BUTTON / PT-47X54J	
<u>26</u>	TBX2AA2701	7-KEY BUTTON / PT-53TW54J	
<u>27</u>	TKP2AA0801	LED PANEL / PT-53TW54J	
	TKP2AA1131	LED PANEL / PT-47X54J	
M018	TKP2AA1361S	SIDE RIGHT PANEL / PT-47X54J	
M019	TKP2AA1362S	SIDE LEFT PANEL / PT-47X54J	
M020	TMM2AE10171	GROMMET SQUARE	
M021	TXFKP07JSER	TOP SHELF / PT-47X54J	
M022	TBL2AH30071	CASTER / PT-53TW54J	
RM002	PNA4701M05TV	IR REMOTE CONTROL RECEPTOR	
SN7201	B3HA00000037	PHOTO DETECTOR (AUTO CONV.)	
JK1001	TJB2AA0481	TERMINAL A/V FRONT / PT-53TW54J	
JK1001	TJB2AA0482	TERMINAL A/V FRONT / PT-47X54J	
JK3301	TJB2AA0521	TERMINAL A/V	
JK3302A	TJB2AA0532	TERMINAL A/V	
JK5001	K1FA119E0001	CONNECTOR	
OTHER ACCESSORIES			
M023	TQB2AA0506	OWNER'S MANUAL	
M024	EUR7603ZF0	REMOTE CONTROL	
M025	EUR7603ZFA	REMOTE CONTROL	
M026	UR76EC0303E	BATTERY COVER(REMOTE CONTROL / EUR7603ZF0 & EUR7603ZFA	



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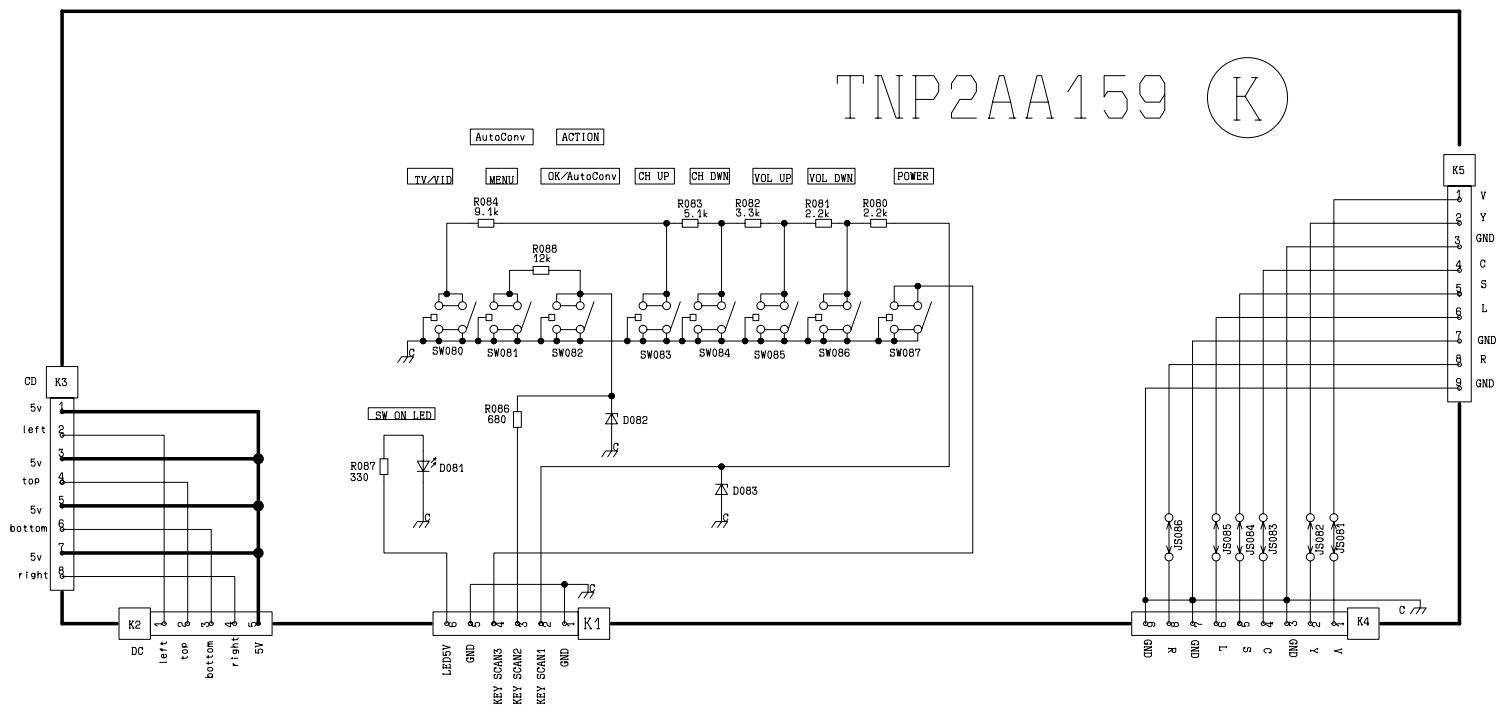
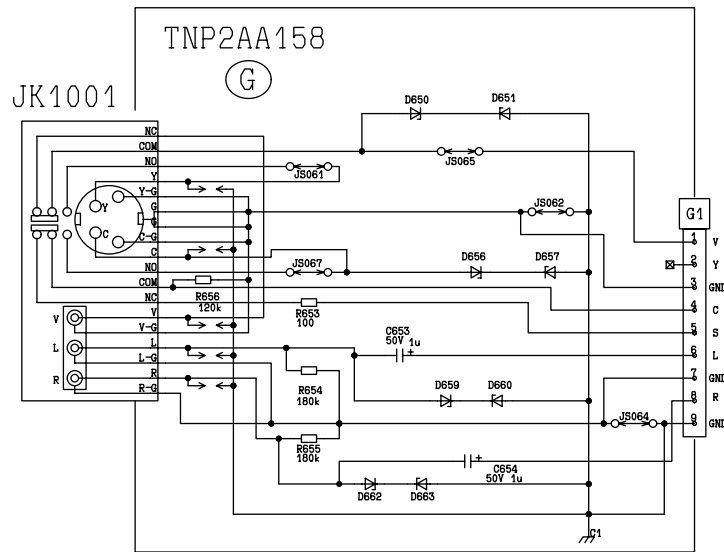


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SEE REVERSE FOR ORDER NO.

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G-BOARD / K-BOARD

TNP2AA158 / TNP2AA159

PT-53TW54J

MTNC040520C1

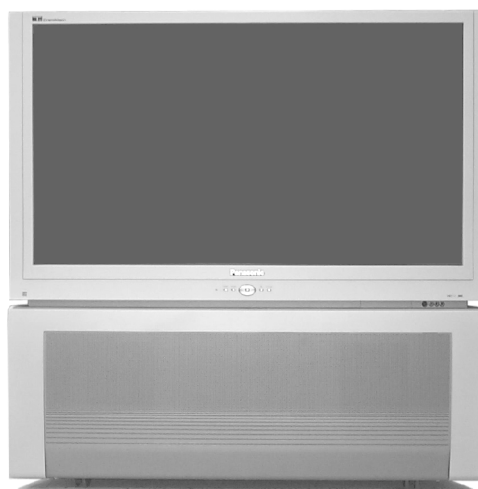
B19

Service Manual

HDTV MONITOR

PT-53X54J

GN1P




WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Safety precautions

General guidelines

An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing. When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always replace protective devices, such as fuse paper, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.

Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. tag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.

The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. Do not use a line isolation transformer when testing.

Leakage current cold check

Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and exposed metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k Ω and 5.2M Ω . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage current hot check

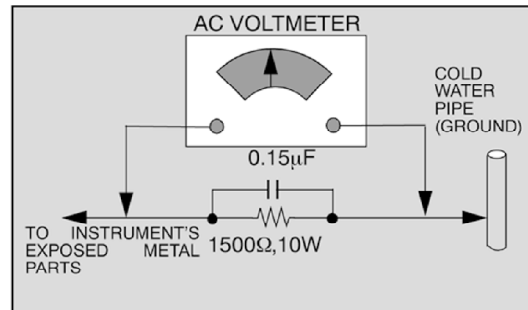
Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check. Connect a 1.5k Ω 10 watt resistor in parallel with a 0.15 μ F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts. Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such as a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliampere. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and

rechecked before it is returned to the customer.

Hot check circuit



Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/ 60Hz for 1 second. Confirm that the current measurement is 0.5mA ~ 2.0mA. Repeat test with other metallic exposed parts.

X-ray radiation

WARNING

The potential source of x-ray radiation in the PTV set is in the high voltage section and the picture tube.

NOTE

It is important to use an accurate, calibrated high voltage meter.

Apply all black video signals (1080i) and confirm high voltage measures $31.5 \pm 1.0\text{kV}$. If the high voltage is not within the range, change C514 (in D-Board) to 1800pF, 2000pF, 2400pF or 2700pF until the desired value is obtained. Apply NTSC white pattern and confirm the high voltage measures $30.1 \pm 1.5\text{kV}$. Apply HD 1080i white pattern and confirm the high voltage measures $30.1 \pm 1.5\text{kV}$.

2. About lead free solder (PbF)

NOTE

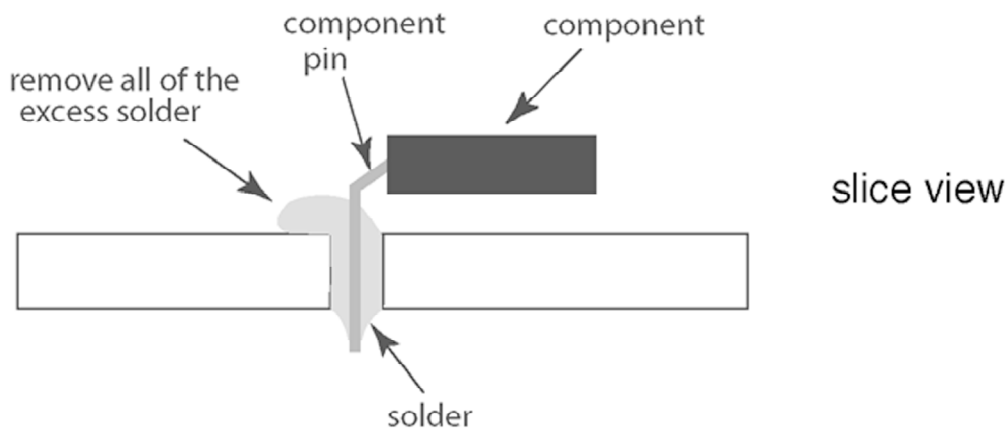
Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in its manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the "PbF" or a leaf symbol stamped on the / back of PCB.



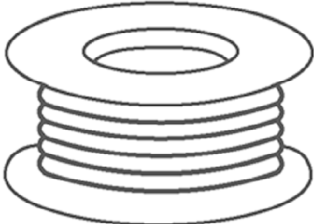
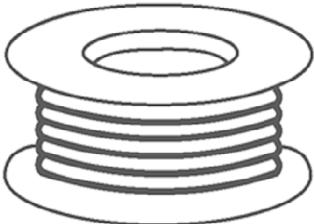
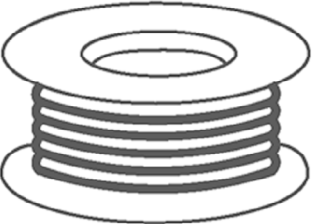
CAUTION

- **Pb free solder has a higher melting point than standard solder.**
Typically the melting point is 50 ~ 70 °F (30 ~ 40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- **Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C).** / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- **After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side.**



Suggested Pb free solder

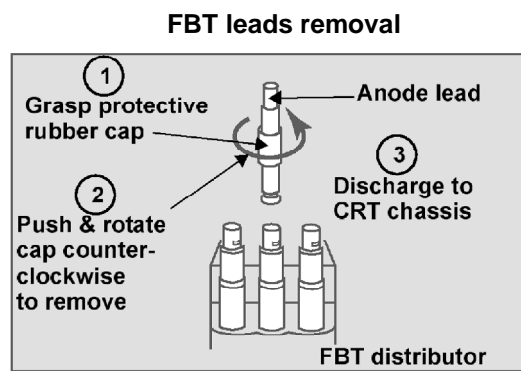
There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

3. Important safety tests

Measuring H.V.

The anode caps are cemented to the CRTs. To gain access for high voltage measurement, remove the red CRT's anode lead from the flyback transformer distributor. Grasp the anode lead protective cap at its bottom and squeeze it against the locking cap body inside, rotate 1/4 turn counter clockwise and pull the anode lead sleeve out of the FBT distributor. Connect a high voltage positive lead from your H.V. meter to the FBT distributor, and the common negative lead to cold ground



Note:

Reinsert the anode lead into the FBT distributor until it is tightly and fully seated. Turn the locking cap clockwise to lock in place.

(EHT) Protector operation check

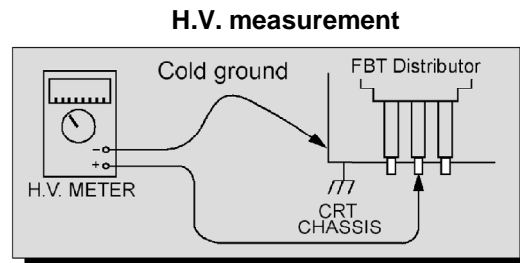
With the cabinet back removed, apply a nominal 120V A.C. to the PTV.

Over voltage test

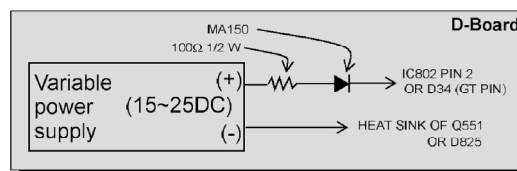
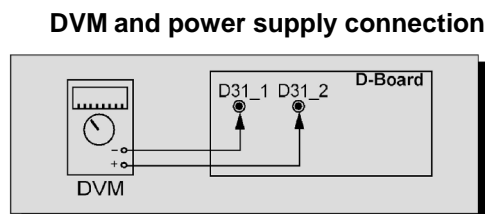
Preparation:

1. Turn PTV "OFF"
2. Connect a NTSC signal generator to the antenna terminal.
3. Connect DVM positive lead to D31 pin 2 and negative lead to D31

pin 1 on D-Board



4. Connect a H.V. meter (static type, class 0.1) with high voltage leads to high voltage distributor on FBT.



5. Connect the 15 ~ 25 V DC variable power supply positive lead to D34 or IC802 pin 2 (D Board) and negative lead to heat sink of Q551 or D825

Procedures:

1. Apply a NTSC white pattern.
2. Turn PTV ON.
3. Adjust the picture or brightness controls so that the DVM reads 12.7 ± 0.4 volts.
4. Increase the variable power supply until set turns off. The set should turn off at 12.7 ± 0.4 volts (DVM) and high voltage less than 36.4kV.
5. If the DVM reading is other than 12.7 ± 0.4 volts, readjust picture or brightness control and repeat steps 3.
6. Turn off the variable supply and confirm that the set will turn on by pulling out AC plug socket and connecting it again.

4. Service notes

NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chips capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6k Ω resistor, 0 = 0 Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

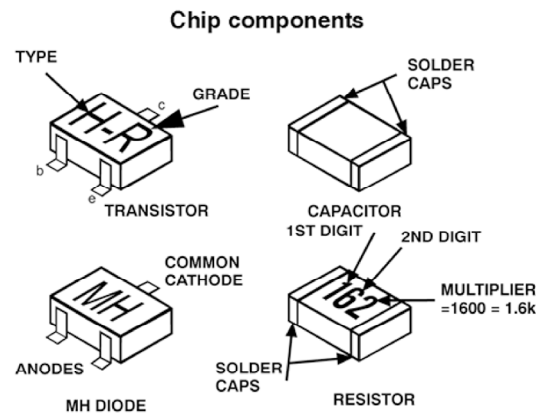
Component removal

1. Use solder wick to remove solder from component end caps or terminal.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

Chip component installation

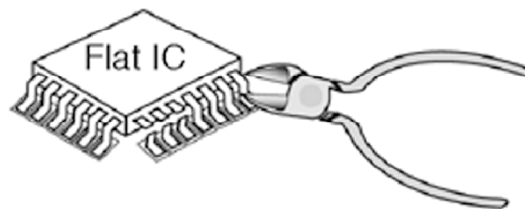
1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area

with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

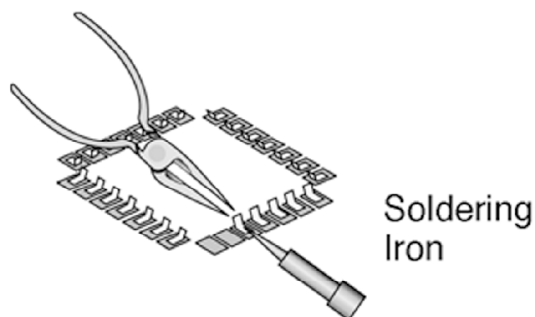


How to replace flat ic (required tools)

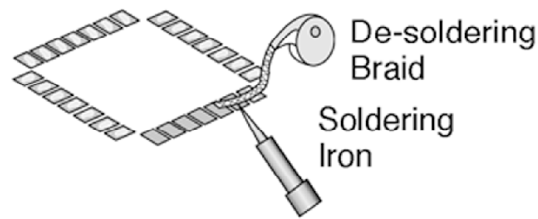
1. Remove the solder from all of the pins of a Flat IC by using a desolder braid



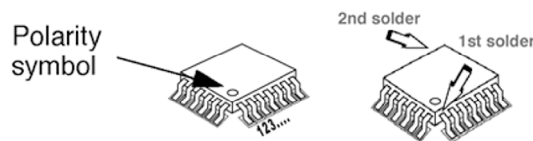
2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



3. Remove the solder from all the pads of the Flat IC by using a de solder braid



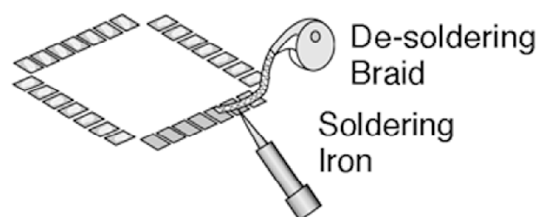
4. Position the new Flat IC in place (apply the pins of the Flat IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol



5. Solder all pins to the soldering pads using a fine tipped soldering iron



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below



IMPORTANT

To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires are securely connected


CAUTION

The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the

chassis. Connect the test equipment to the proper ground(HOT or COLD) when servicing, or incorrect voltages will be measured.

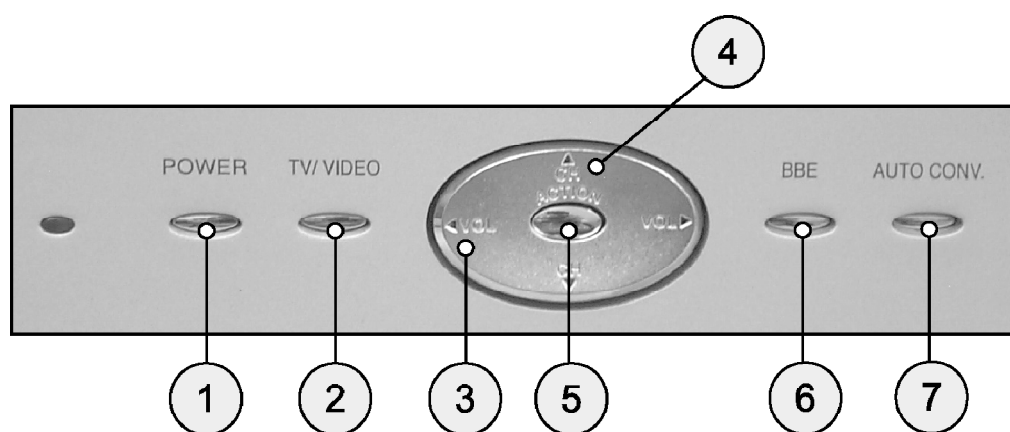
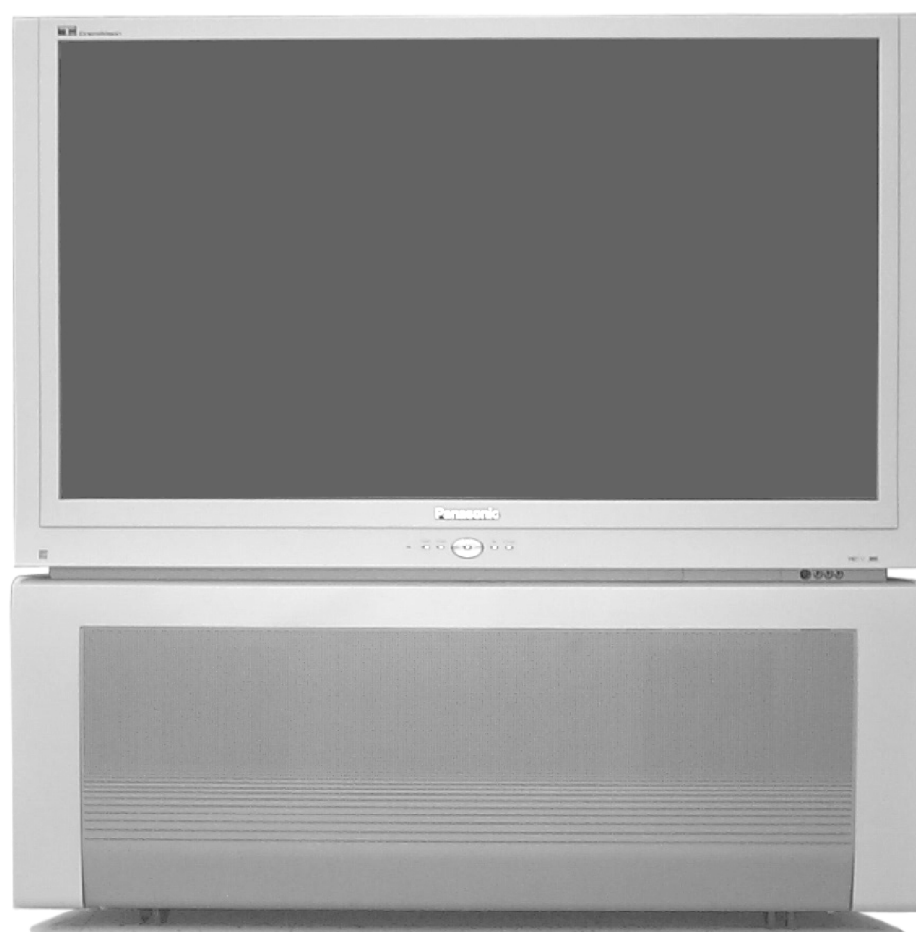
WARNING

This receiver has been designed to meet or exceed applicable safety and x-ray radiation protection as specified by government agencies and independent testing laboratories.

To maintain original product safety design standards relative to x-ray radiation and shock and fire hazard, parts indicated with the symbol  on the schematic must be replaced with identical parts. Order parts from the manufacturer's parts center using the parts numbers shown in this service manual, or provide the chassis number and the part reference number.

For optimum performance and reliability, all other parts should be replaced with components of identical specification.

5. PTV Location of controls



QUICK REFERENCE BUTTON OPERATION	
①	POWER - Press to turn ON or OFF.
②	TV/VIDEO - Press to select TV or one of the video inputs.
③	VOL - Press to adjust sound level, settings and features on menu.
④	CH - Press to select programmed channels. Press to highlight desired features when menus are displayed.
⑤	ACTION - Press to access menus.
⑥	BBE - Press to set BBE sound ON or OFF.
⑦	AUTO CONV. - Press to access the auto convergence process.

6. Receiver feature table

FEATURE/MODEL	PT-53X54J
CHASSIS	AP832
MICRO	256K
MENU LANGUAGE	ENGLISH/SPANISH/FRENCH
CLOSED CAPTION	X
V-CHIP (USA/CANADA)	X
CHANNEL INFO BANNER	X
VIDEO INPUT SKIP	SKIP
CHANNEL COUNT	181
CHANNEL COUNT	181
PIP (1T), 2T PIP (2T), 2T SPLIT	2T SPLIT
REMOTE CONTROL (W/LIGHT)	EUR7603ZF0
CRT SUPPLIER	MDDA (CENTAUR IV)
SCREEN	W/PROT SCREEN
CHASSIS	GN1P
COMB FILTER	MOTION ADP, 3D Y/C
HEC/VEC (X=BOTH)	X
NEW YNR	X
VM	X (SELECTABLE)
V/A NORM (X=BOTH)	X
COLOR TEMP	X
AUTO CONVERGENCE	X
AIP	X
PRESET/INPUT LABELING	X
VIDEO PICTURE MEMORY	X
DIGITAL SCAN RATE	1080i, 540p
NTSC LINE DOUBLER	540p PROGRESSIVE (NEW)
MTS/SAP/DBX	X
BUILT-IN AUDIO POWER	15W x 2 (10%)
No. OF SPEAKERS	4

FEATURE/MODEL	PT-53X54J
BASS/BALANCE/TREBLE CONTROL	X
AI SOUND	X
SURROUND	X
SPATIALIZER/BBE	BBE
A/V IN (REAR/FRONT)	4(3/1)
A/V PROGRAM OUT	X
AUDIO OUT (FAO: F, VAO:V)	F,V
COMPONENT INPUT (Y, Pb, Pr)	2
S-VIDEO INPUT (REAR/FRONT)	2/1
HDMI/HDPCP INPUT	X

Note:

Specifications are subject to change without notice or obligation.

7. Board description table

BOARD	PART NUMBER	DESCRIPTION
A-BOARD	TNP2AH058	MAIN CHASSIS
D-BOARD	TNP2AH059	POWER SUPPLY
CD-BOARD	TNP2AA166	AUTO CONVERGENCE SENSOR
* DC-BOARD	TNP2AA163	CONVERGENCE PROCESSING
* DG-BOARD	TNP2AA173AE	MPU, VIDEO SIGNAL PROCESSING
G-BOARD	TNP2AA164	FRONT A/V INPUT
H-BOARD	TNP2AA174AD	REAR A/V INPUTS
K-BOARD	TNP2AA165	KEYBOARD PANEL
LB-BOARD	TNP2AA161	BLUE PRT
LG-BOARD	TNP2AA160	GREEN PRT
LR-BOARD	TNP2AA162	RED PRT
R-BOARD	TNPA0615AB	IR SENSOR

NOTE

When ordering a replacement board assembly, append an “S” to the board number

EXAMPLE

To order the A Board, the replacement board is TNP2AH058S

*

CD-Board, DC-Board and DG-Board are non-serviceable boards, except for the connector JK5001 in DG-Board. If any of these boards are defective, replace it with a new one.

8. Location of controls (EUR7603ZF0 remote)

POWER
Press to turn ON and OFF.

MUTE
Press to mute sound.

ASPECT
Press to change the aspect ratio of image.

TV - VCR - DVD - DBS - RCVR
Press to select a component.

ACTION
Press to access the menu.

MENU
Press to turn BBE on or off.

RECALL
Press to display time, channel sleep timer and other options.

KEYBOARD
Press to select any channel.

R-TUNE
Press to switch to previously viewed channel or video mode.



SAP
Press to access the secondary audio program broadcast.

LIGHT
Press to illuminate the keypad.

TV/VIDEO
Press to select TV or input mode.

VOL
Press to adjust TV sound and navigate in menus.

CH
Press to select next or previous channel and navigate in menus.

EXIT
Press to exit adjustments or menus.

GUIDE
Press to access DBS functions.

SPLIT / SEARCH
Press to access split or search functions.

DVD/VCR
Press to control DVD or VCR functions.

Note:

For additional information for this remote please refer to the owner's manual section remote operation, listed on the parts list section.

9. Auto diagnosis feature

This receiver incorporates a self diagnosis feature. With this feature it will be easier for the technician to detect failures. There is a LED located by the keyboard on the front panel, this LED will start flashing when SOS is detected by the circuits located in specific areas, depending on how many times the LED is flashing, this will indicate what circuit should be checked. Make a count of flashing and see the table shown below. Please use this feature effectively especially for intermittent problems.

NUMBER OF FLASHES	POSSIBLE CAUSE
1	POWER SUPPLY AND/OR VERTICAL
2	LOW DC
3	CONVERGENCE (DC-BOARD)
4	SUB9V
5	HHS
6	IC4001
7	IC4201
8	IC4401

10. EEPROM copy jig

This PTV has a feature that allows to clone convergence from main EEPROM data adjustments from a PTV to other by connecting a jig to the PTV set, or can be used to back-up data before making adjustments. A jig part number TXFJIG01SER, is available through Matsushita/Panasonic Services.

Preparation:

To connect this jig, remove the lower back cover as instructed on disassembly for service section on this service manual and insert the jig into A15 connector located on A-Board. (See figure).

Procedure to copy data:

1. Enter to service mode and display service menu (see service mode section).
2. Select “AREA” DAC and then press ACTION button on remote to enter. Press VOL right/left to select one of the following options then press ACTION:
 - Select ALL to copy all main EEPROM data
 - Select ADJ to copy only adjustment data.
 - Select FIX to copy only fix data
3. To copy data from main EEPROM to jig, select “IN → EX” DAC and press ACTION button on remote. The register background will momentarily become yellow indicating that copy is in progress.
4. To copy data from jig to main EEPROM, select “EX → IN” DAC and press ACTION button on remote. The register background will momentarily become yellow indicating that copy is in progress.

Procedure to copy convergence:

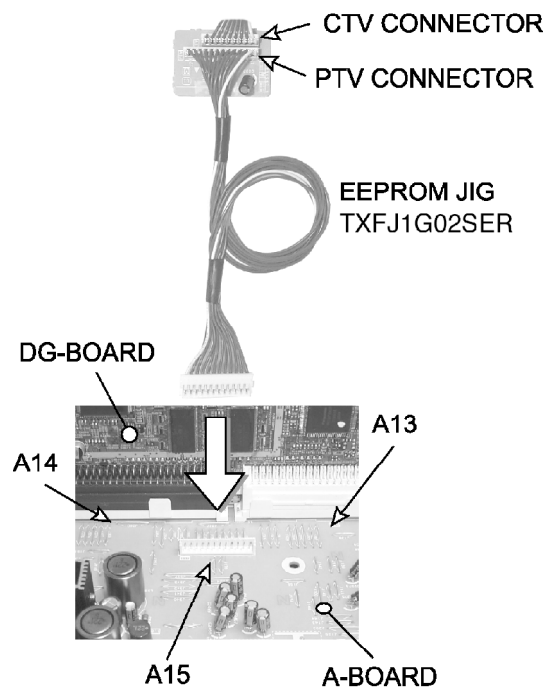
1. Enter to service mode and display service menu
2. Select “FINE” DAC and press ACTION on remote.
3. Press “8” on remote.
4. Select from and then press ACTION on remote:
 - INT to copy data from internal EEPROM to jig
 - EXT to copy from jig to internal EEPROM.
5. Select an option from the menu with CH keys and confirm with ACTION:
 - DEFAULT: default factory preset
 - CURRENT: to copy the current (receiver data or jig data) convergence adjustments to memory.
 - NOT USE: to back up data.
 - ALL: to copy all data.

NOTE:

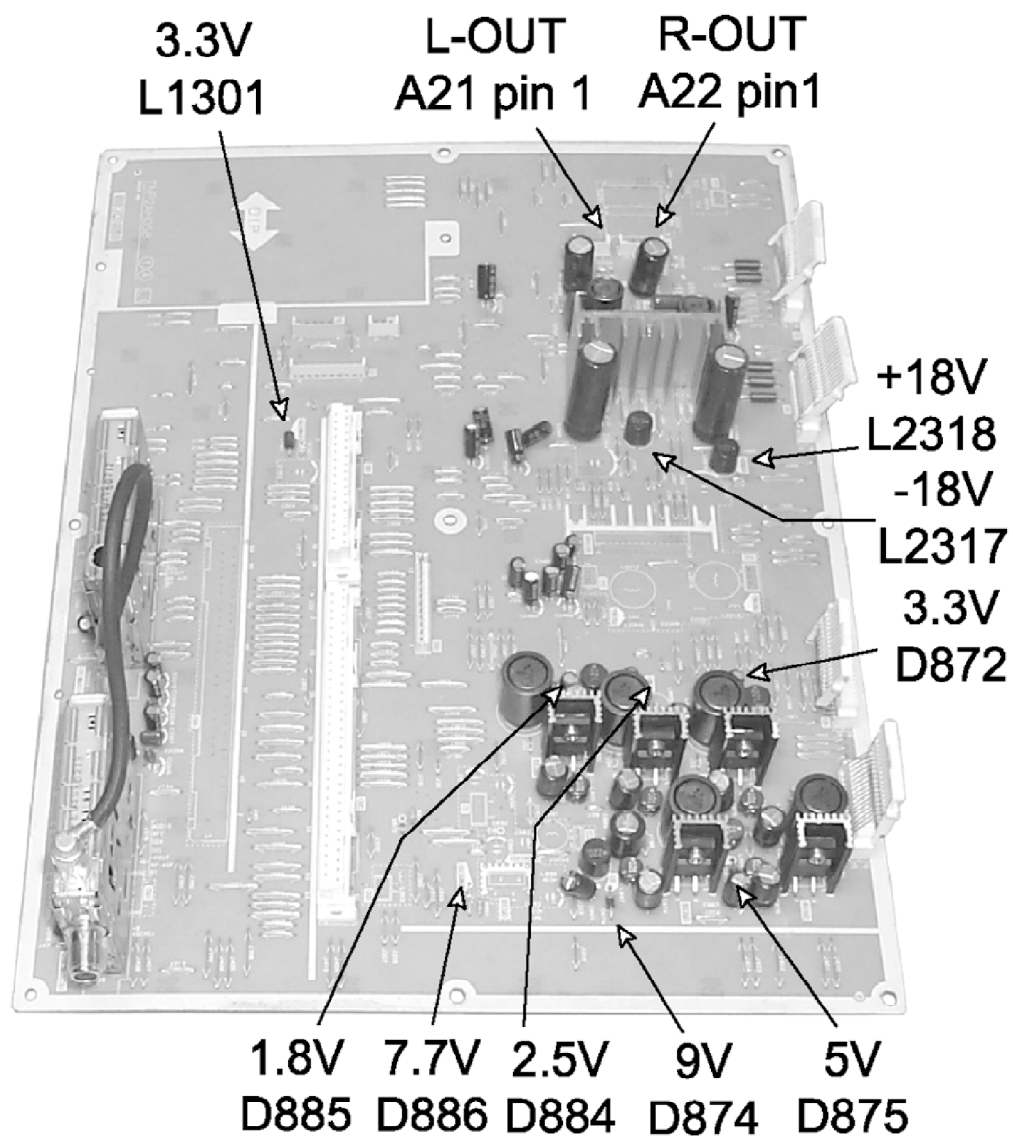
The stated as default factory preset contain the factory DATA; Use this option when data was lost or when adjustment is lost completely.

6. Select destination to copy (INT or EXT) and confirm with ACTION.
7. Once an option is selected the copy process begins.
8. To exit “FINE” register press POWER and select “YES” option with ACTION. When the AUTO OFFSET process end, shut off the receiver.
9. Remove the copy jig from A15.

EEPROM copy jig connection

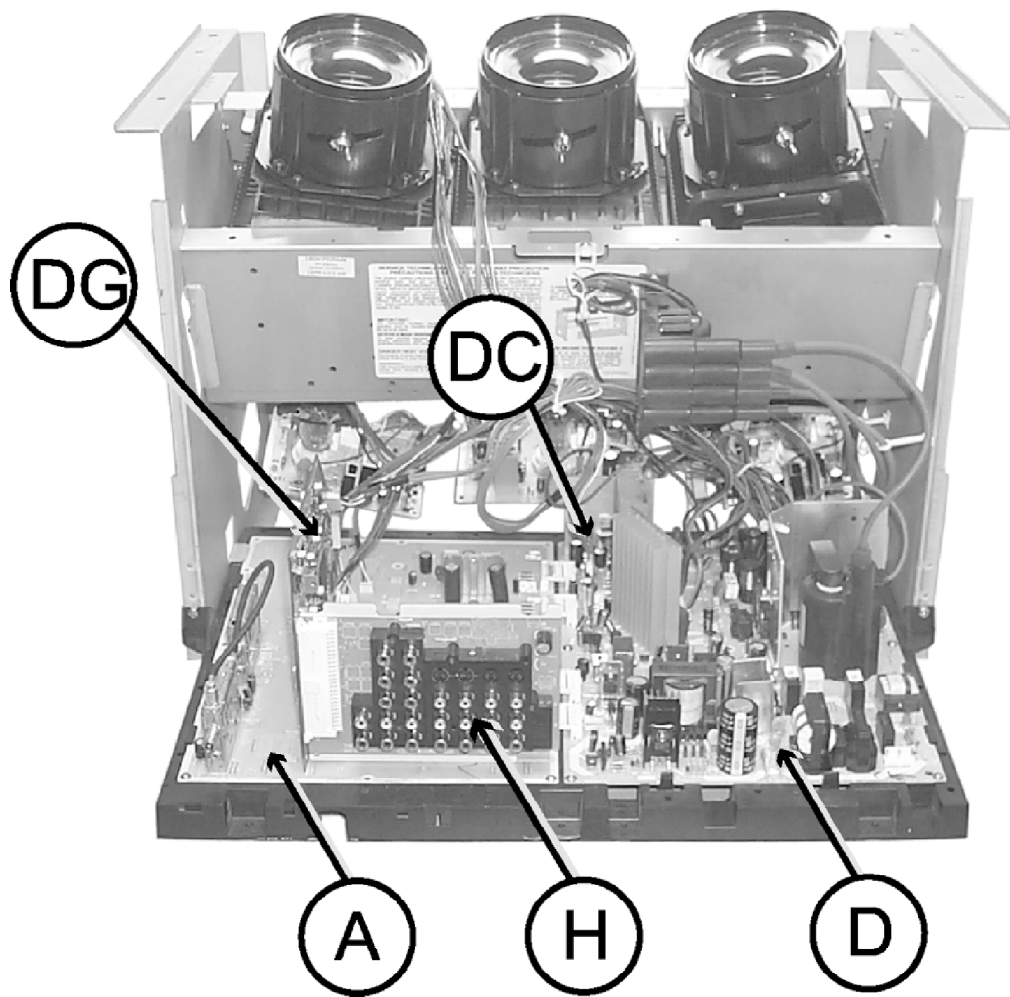


11. A-Board check points

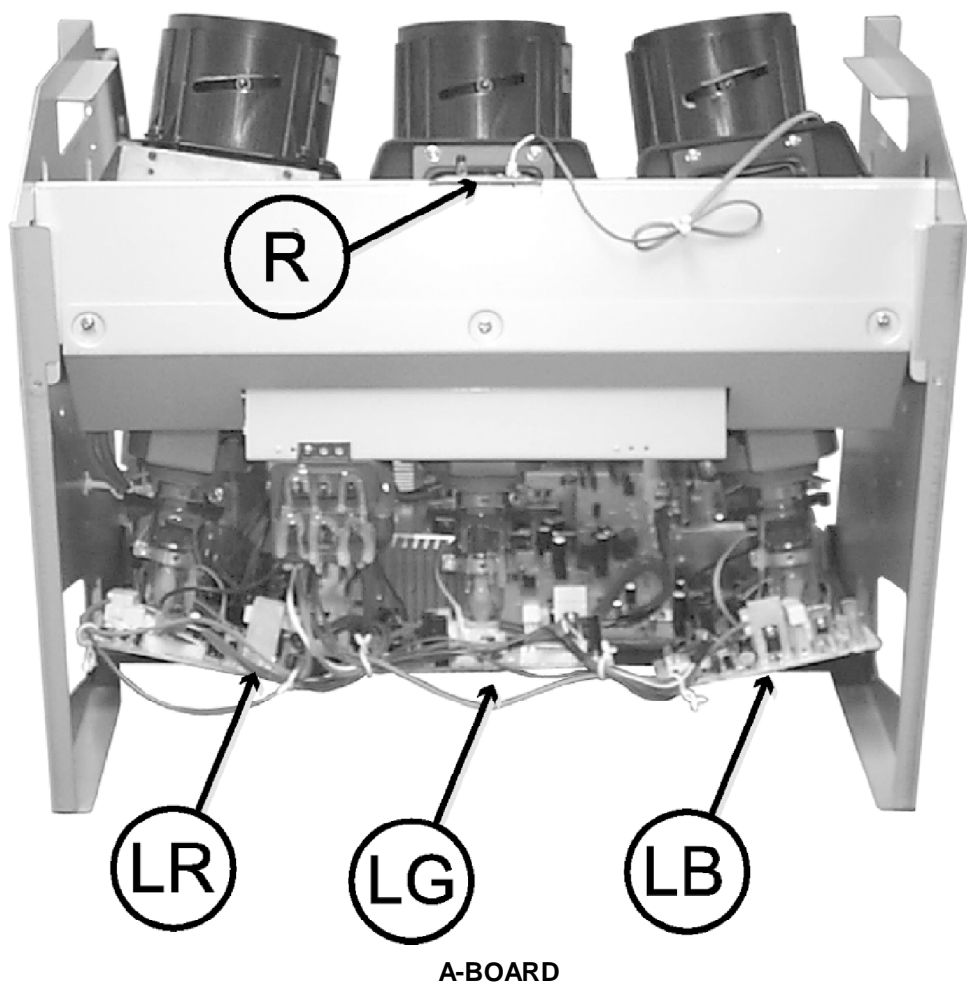


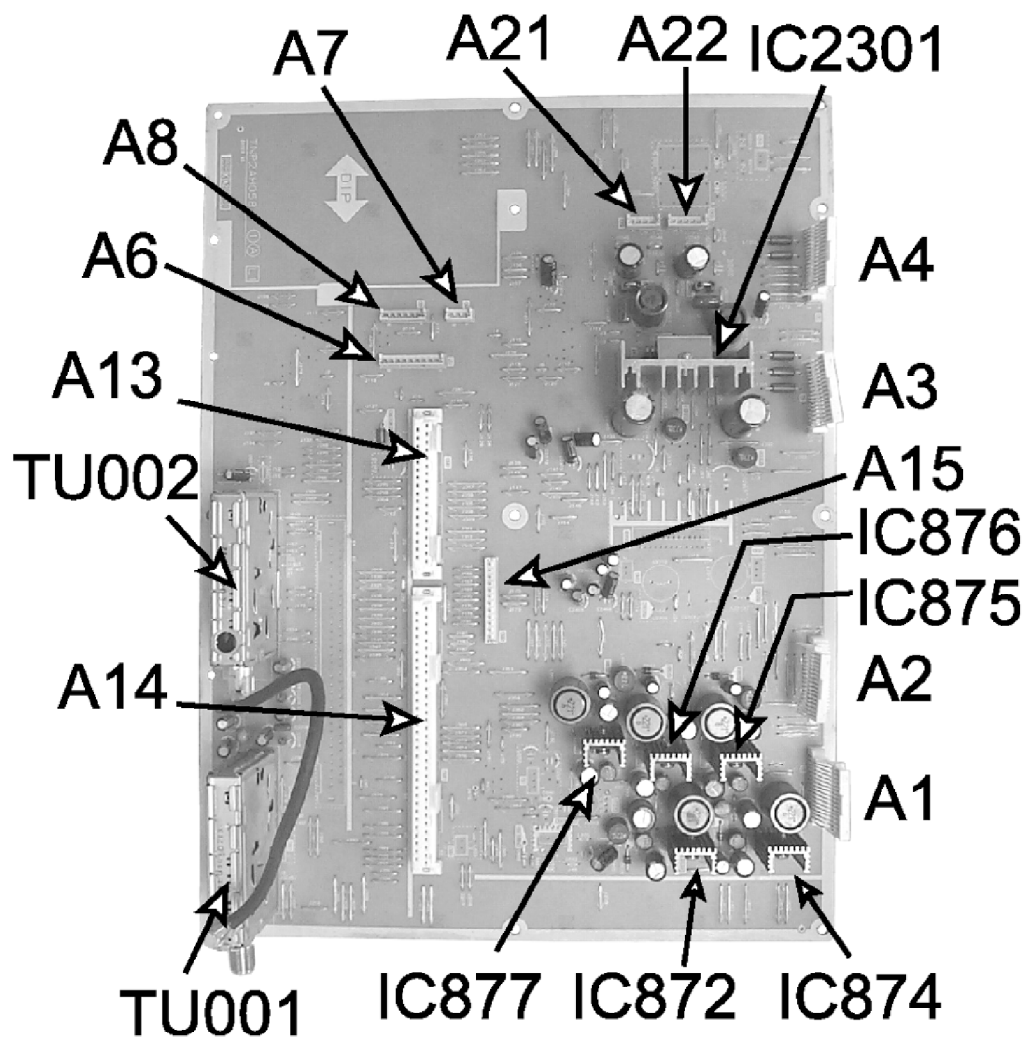
12. Chassis & boards layout (location of main components)

Chassis and boards layout

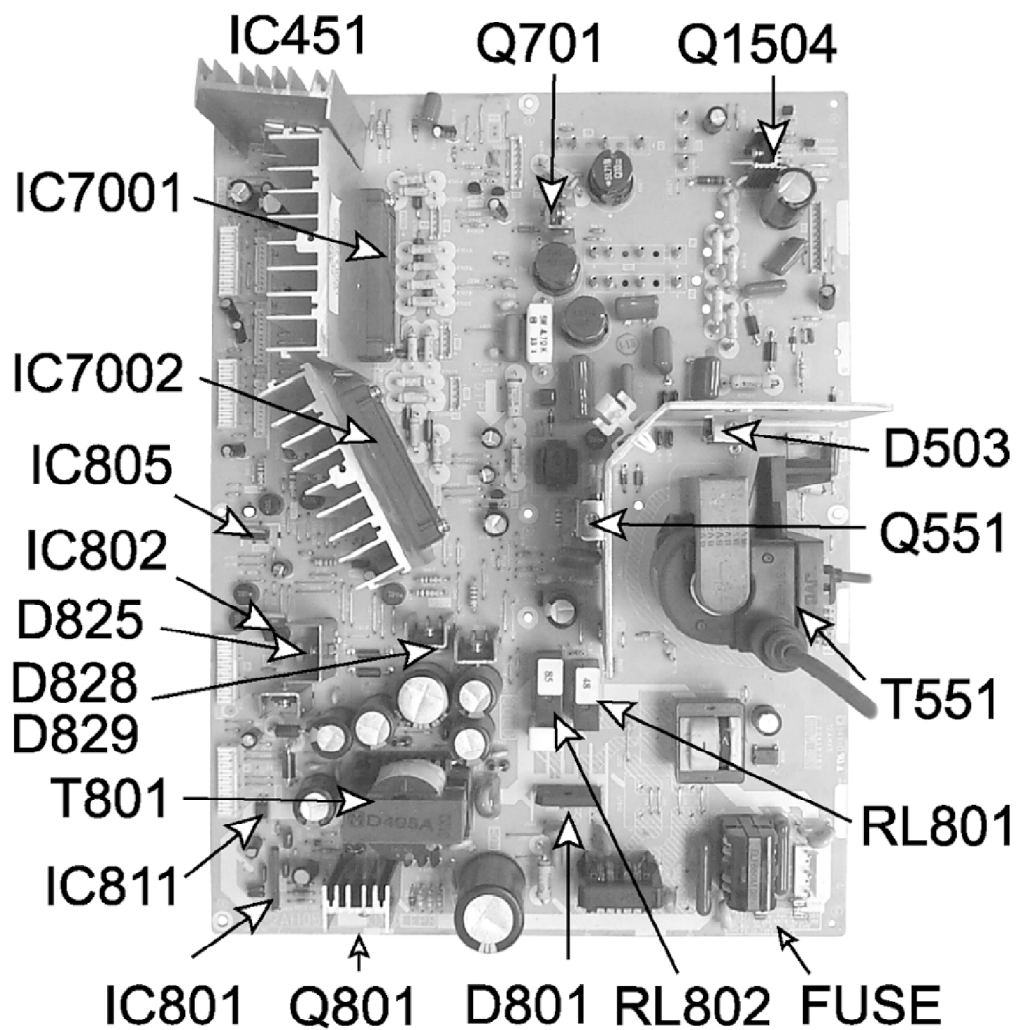


Chassis and boards (FRONT)





D-BOARD



R-BOARD

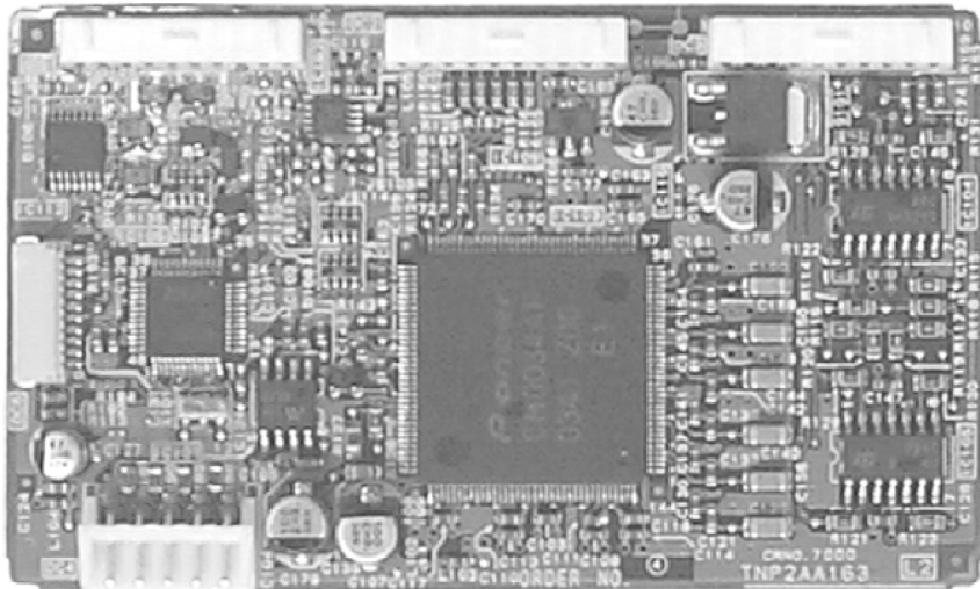


DC-BOARD (TOP)

DC1

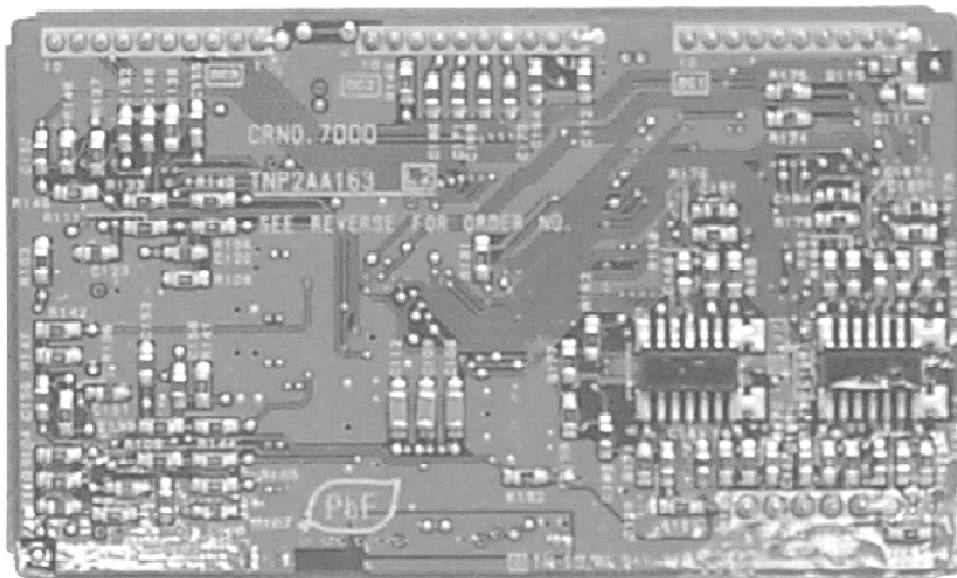
DC2

DC3



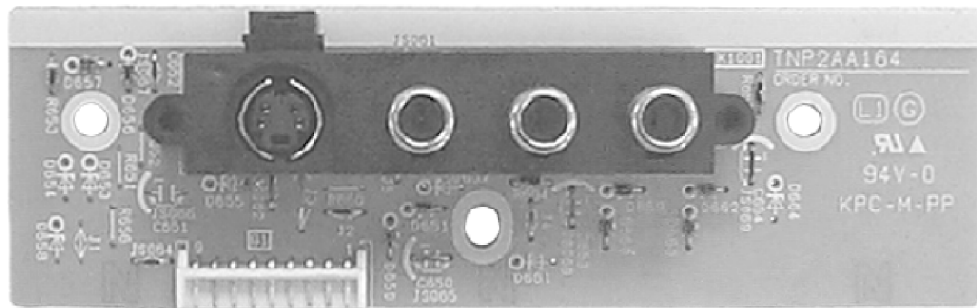
DC4

DC-BOARD (BOTTOM)



G-BOARD

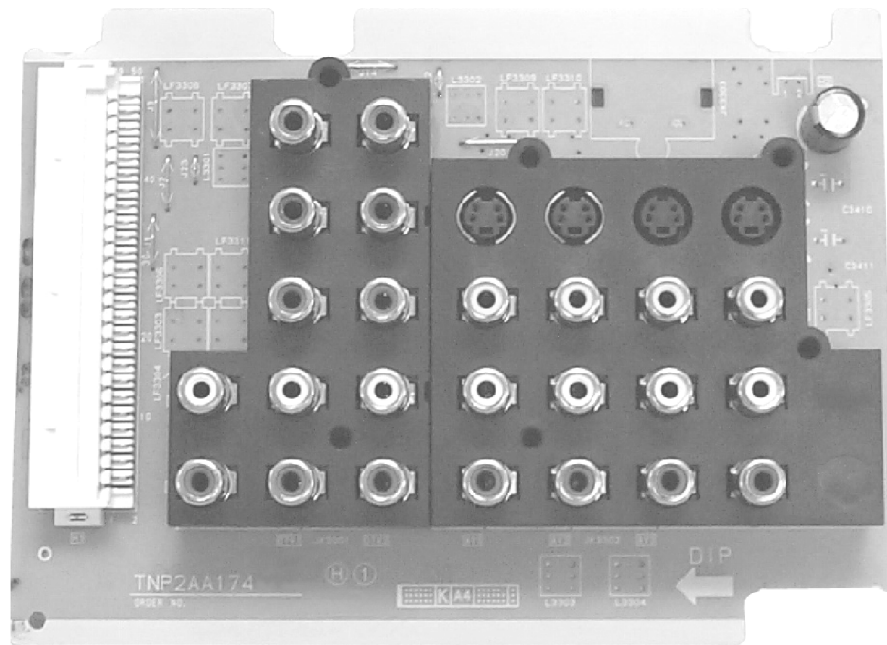
JK1001



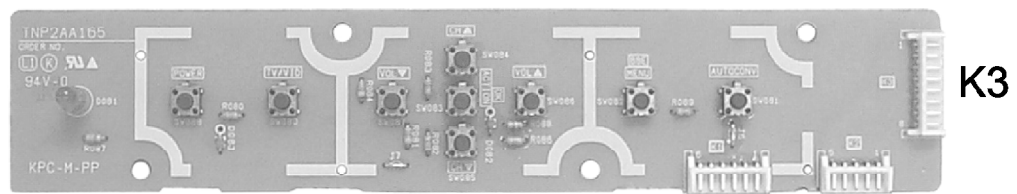
G1

H-BOARD

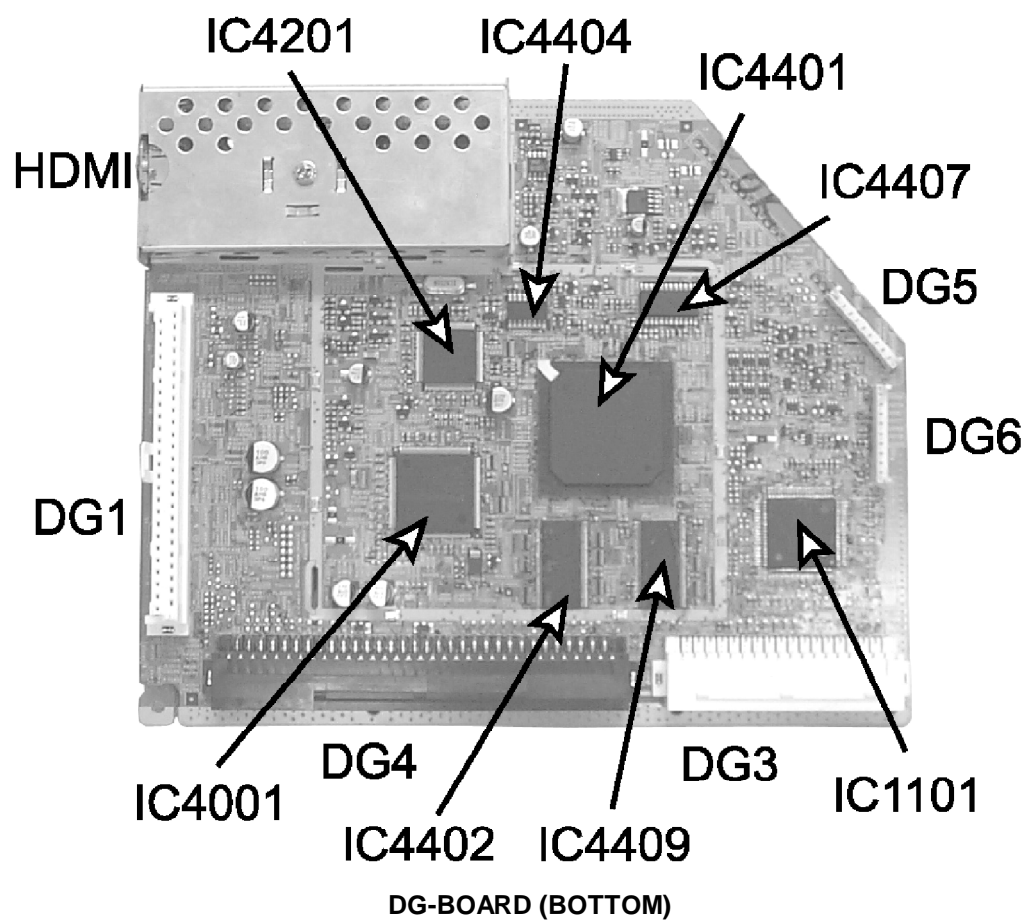
H1

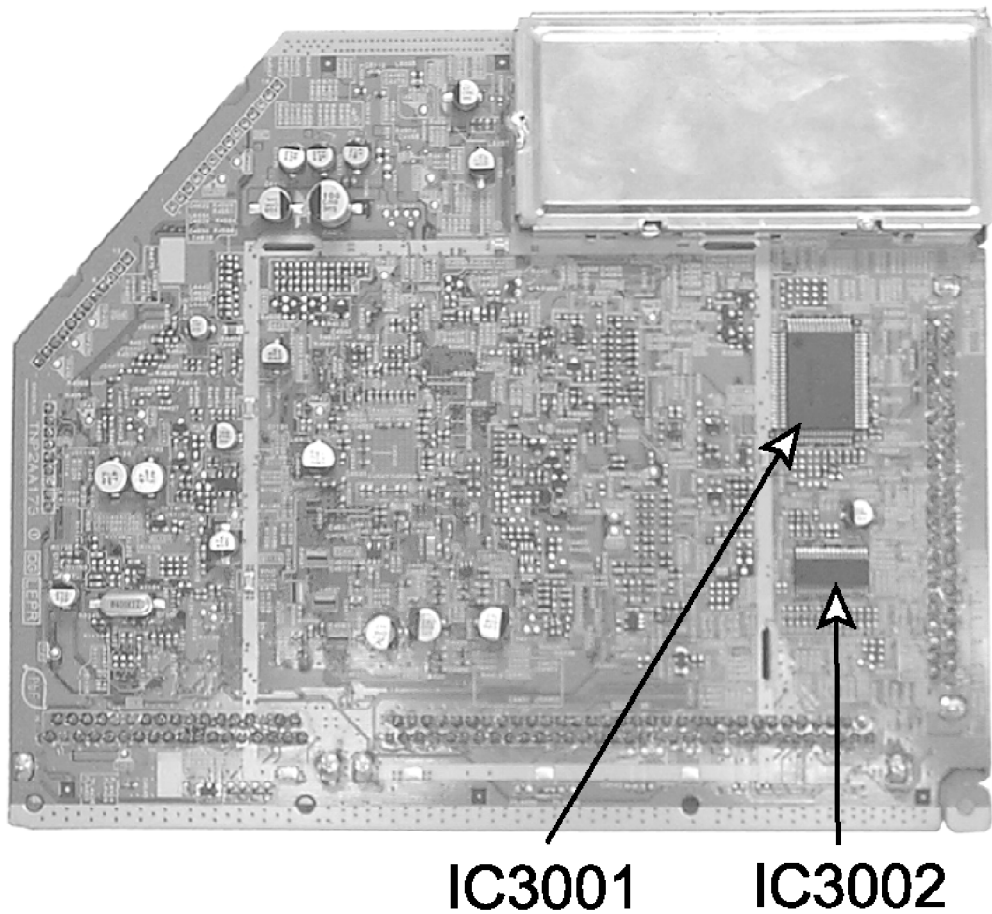


K-BOARD



DG-BOARD (TOP)





13. Disassembly for service

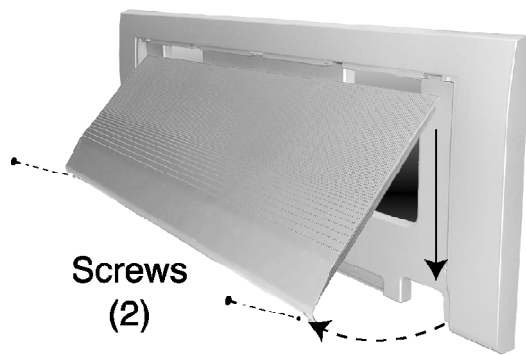
NOTE:

Board ground wires may have to be disconnected to disassemble some boards. All ground wires must be reconnected using jumper leads, if necessary, before power is applied to PTV for service.

Speaker grille removal

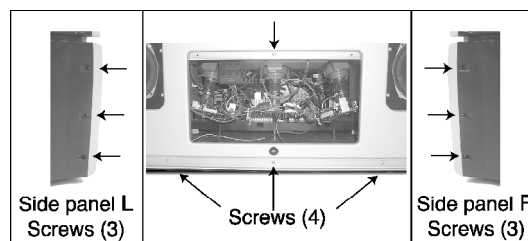
Speaker grille, is secured to the cabinet of the PTV with 1 velcro dot and 2 screws at the bottom. Take the screws out and grip panel from the bottom, pull slightly backward and at the same time pull down to uncouple the 4 tabs. When reassembling, make certain to firmly press on the panel where the velcro dot is and that the four tabs are properly inserted in the front cover.

Speaker grill removal



Front cover replacement

1. Remove the speaker grille.
2. Remove the cabinet front board by removing the 2 screws in the middle section.
3. Remove the screws from the middle section (4) of the front panel and both side panels (3 in each side from the back, see picture).



4. Pull the front panel from the bottom slightly downwards to unlock the tabs and remove.

Speakers replacement

1. Each speaker set is conformed by a tweeter and a woofer mounted in an enclosure fixture. This fixture is fastened to the main cabinet board by 6 screws. The tweeter and woofer are mounted in the fixture with 2 screws (each speaker). It is recommended for speaker servicing to remove the speaker enclosure.
2. Disconnect the R (A22) and L (A21) speaker connectors from A-board.

IMPORTANT!!

When replacing speakers (tweeters and woofers) be sure to order the proper replacement part number. Check part number on the

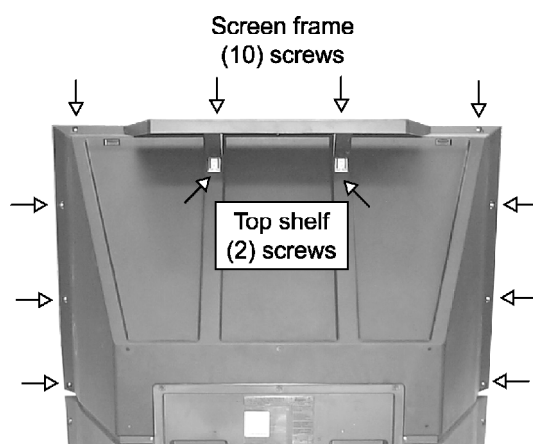
back of the speaker and order accordingly as different part numbers differ on PT-53X54J models. Also check part list when ordering.

Part number	Replace with	Description
EAST16P51A	EAST16P51A	Speaker Woofer
EAST6PH08P	EAST6PH08P	Speaker Tweeter
TAS2AA0027	TAS2AA0027	Speaker Woofer
TAS2AA0022	TAS2AA0022	Speaker Tweeter

Screen frame removal

1. First, remove the front panel.
2. Below the screen, remove the 5 screws from the tabs, just below the front A/V inputs.
3. Remove the 10 screws from the back cover. At this point the top shelf must be removed from the back cover (2 screws). Be careful when removing the screen frame, try removing the screws from the sides first and leave the top screws at last, be sure to hold the frame when removing the last screws.

Screen frame removal (back view)



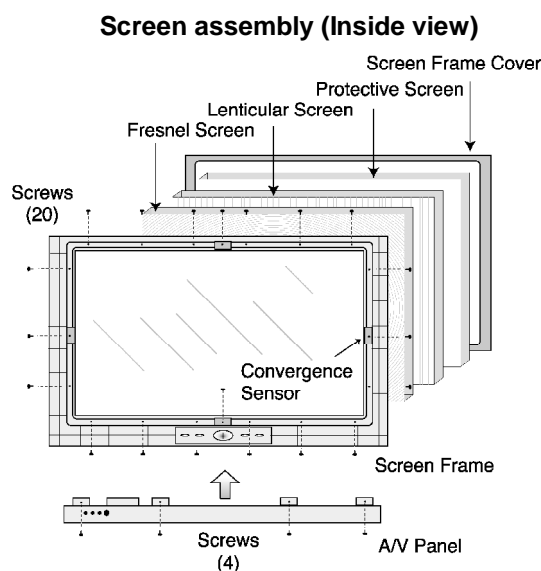
4. Tilt the assembly forward while lifting it out of place.

CAUTION:

At this point the keyboard, A/V inputs and convergence sensors, must be disconnected from K-board and G-board, otherwise the cables and connectors could get damaged.

Screen assembly

- 1. Remove the screen frame. See screen frame removal procedure above.**
- 2. Place screen frame face down on a soft surface.**
- 3. If necessary remove G-board and/or K-board.**
- 4. If necessary disassemble A/V panel removing the screws (4) and tilt the panel upwards and release it from screen frame.**
- 5. Remove the screws from the screen frame (20), be careful not to damage the convergence sensors (see picture).**



- 6. Carefully lift screen frame leaving the screen frame cover with the 3 screens (Fresnel, Lenticular, Protective) on top of it.**

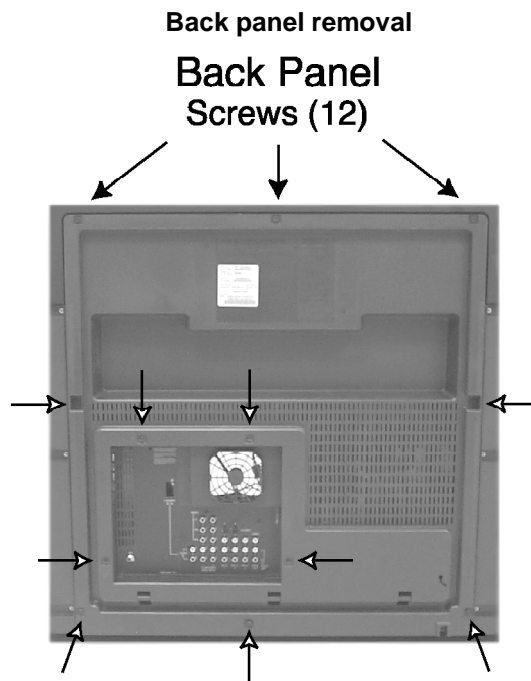
Keyboard and front A/V inputs removal

- 1. Unplug the connectors from keyboard and front A/V inputs assemblies. Remove the screws affixing the keyboard (4 screws) and front A/V inputs (3 screws) and tilt the A/V panel assembly**

upward and release it from the screen frame.

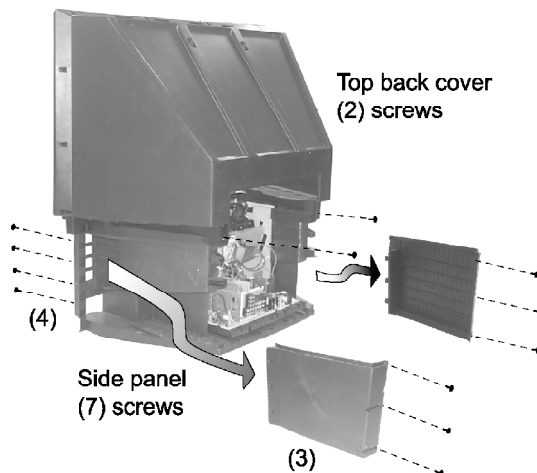
Back panel removal

1. The back panel is fastened to the cabinet by 12 screws. See picture for screw location.

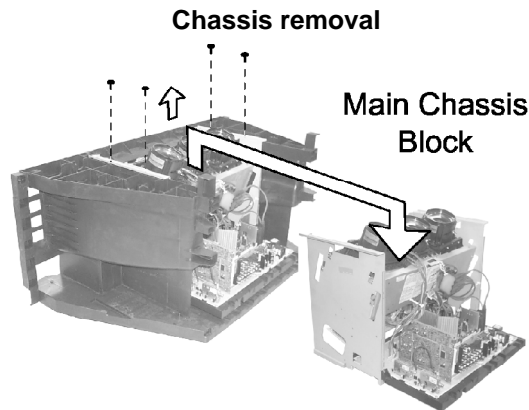


Main chassis block

1. After removing the screen frame and front cover, remove the side panel from each side (each side panel is fastened by 7 screws, 4 at front and 3 in the back).

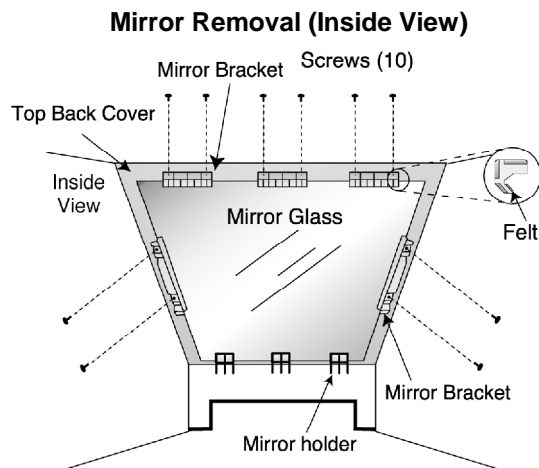


2. Remove the 2 screws from the cabinet body that holds the upper cabinet cover and carefully remove it.
3. The main chassis block is secured to the main body cabinet by 4 screws on the top (see picture).



Mirror removal

The mirror is attached inside the cabinet cover. Carefully remove the cabinet cover to access its interior surface and remove the screws securing the brackets that hold the mirror at the top and sides to the mirror.



13.1. Chassis assembly

The chassis assembly shown in figure includes all the electrical and optical components (light box).

Chassis back view



AV BACK COVER ASSEMBLY

This assembly is secured to H-Board by 8 screws.

H-Board

- 1. H-Board is connected to DG-board with H1 connector.**
- 2. Pull carefully to the right to disconnect.**

DG-Board

- 1. Plugs onto A-Board at A13 and A14 connectors (DG3 and DG4 respectively).**
- 2. Remove plug cables from connectors DG5 and DG6.**

NOTE:

This board is non-serviceable. / When removing this board pull carefully.

A-Board

- 1. A-Board is secured to the chassis tray with six screws.**
- 2. The A-Board is mated to D-Board by four flexible connectors (male side of connectors): A1, A2, A3 & A4. To remove this board, unplug the connectors of A-Board pulling from the sides of each connector.**

NOTE:

Some tie wraps that secure the wire dressings may need to be unfastened for chassis removal.

- 3. Remove plug connector in A6 that goes to G-Board (G1).**
- 4. Remove plug connectors in A7, A8 that goes to K-board (K1) and R-board (R1).**

D-Board

- 1. D-Board is secured to the chassis tray with five screws.**
- 2. The D-Board is mated to A-Board by four connectors (female side of connectors): D1, D2, D3 & D4. To remove this board, unplug the connectors on the A-Board pulling from the sides of each connector.**

NOTE:

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

DC-Board

- 1. Plugs onto the D-Board at the D21, D22 and D23 (DC1, DC2 and DC3 respectively) connectors.**

NOTE:

This board is non-serviceable. / When removing this board pull carefully.

R-Board

- 1. This board is secured to the upper front side of the light box by one screw, and plugged to R1 connector from A7 on A-Board.**

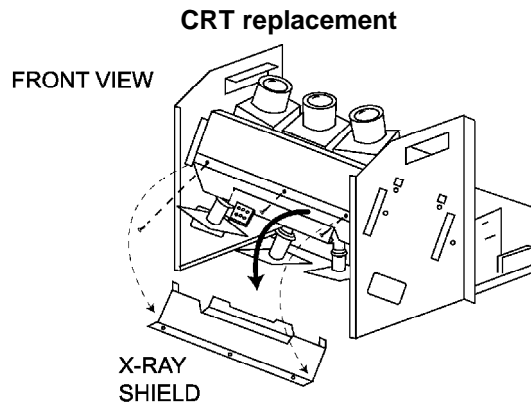
LR, LG and LB Board

- 1. Each board is plugged into the socket on the PRT neck, LR-Board on red PRT, LG-Board on green PRT and LB-Board on blue PRT.**

13.2. Disassembly for CRT replacement

To facilitate CRT replacement, the complete CRT mounting chassis does not need to be removed.

1. Remove the main chassis block from the cabinet.
2. Remove the optical bracket metal cover (front side x-ray shield) by removing 3 screws on top.

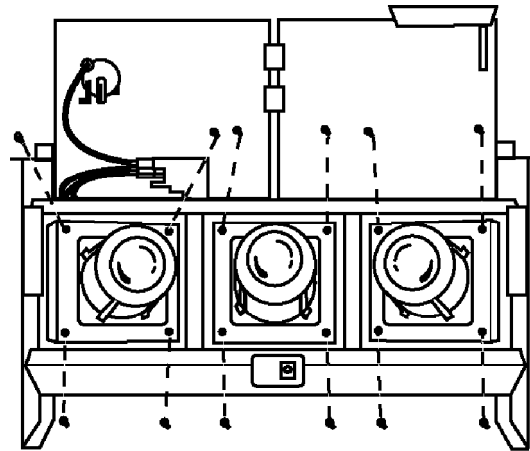


3. Remove the defective CRT anode lead from the high voltage distributor block that is mounted on the flyback transformer. Discharge to CRT chassis.
4. Unplug connectors from D-Board. See board layout. D14 for red, D15 for green and D16 for blue.
5. Unplug the defective CRT black DAG ground connector from the CRT Board.
6. Remove the CRT Board from the defective CRT neck.
7. Remove (4) screws from the defective CRT housing.

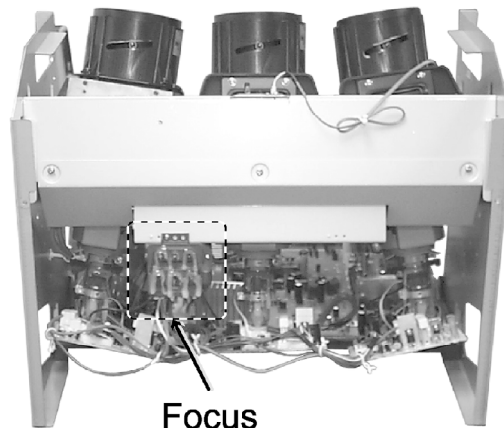
Caution:

Do not remove the (4) CRT lens screws. Support the CRT assembly when loosening screws.

CRT replacement



Focus pack location



Focus
Pack

8. Release CRT anode lead from CRT chassis wire clamp and all other wires from holders.
9. Loosen a screw that secures the DY and remove it from the CRT neck.

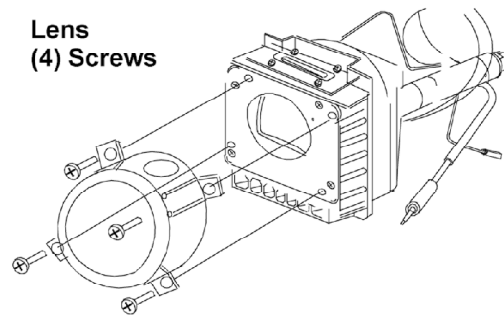
Caution:

To insure protection against x-ray radiation, the lens must be mounted in place at all times when power is applied to the PTV

CRT replacement

1. Remove CRT focus lens assembly (4 screws)

CRT assembly



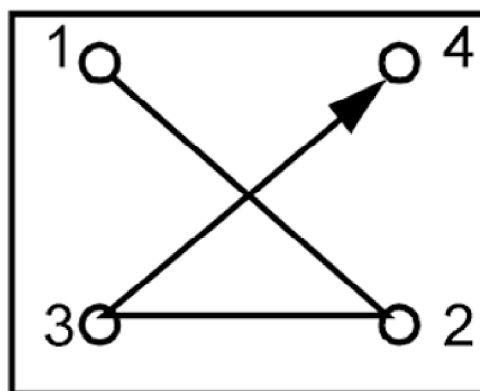
2. Lay CRT face down on a soft cloth.
3. Note position of yoke with centering tabs and remove from defective CRT.
4. Remove CRT DAG ground from defective CRT. Mount it on the replacement CRT exactly as it was on the defective CRT.

Note:

Replacement CRT is supplied with H.V. anode lead attached.

5. Wire the anode lead wire.
6. Install yoke with other CRT neck assemblies on CRT neck in the same order and position as removed from the defective CRT.
7. Press yoke against bell of CRT and tighten the clamp just snug enough so it will not easily shift.
8. Assemble CRT focus lens assembly to new CRT with (4) screws. Make sure focus lens adjustment nut is in the same location as on other CRT focus lens

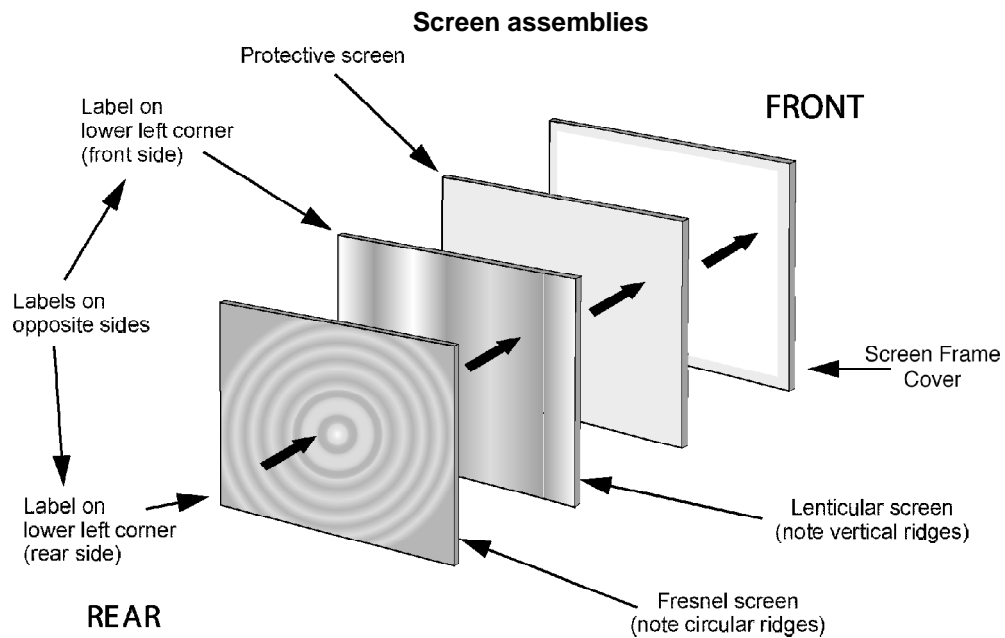
CRT screw tightening order



Note:

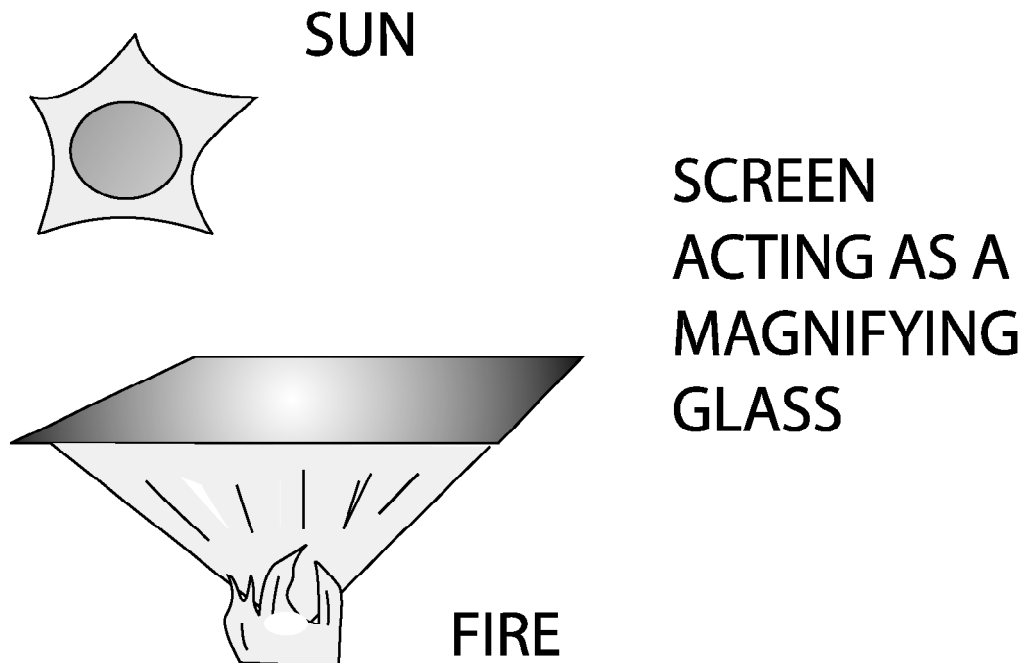
Please assemble with screws in the order shown and tighten with the same torque.

13.3. PTV screen assemblies



13.4. Screen assemblies warning

When storing or disposing of screen assemblies, be sure not to place them in direct sunlight. These screens may act as a magnifying glass and could cause a fire.



14. B + voltages table

Preparation:

Set the following controls

- **Picture to Normal**
- **Bright to Normal**
- **Volume to MIN (0)**

Procedure:

1. Apply a COLOR BAR pattern
2. Connect the negative lead of the digital voltmeter to TPGND1 (cold ground).
3. Connect the positive lead of the digital voltmeter to each test point and confirm the B+ voltages.

No.	D-Board Test point	Voltage
1	TPD14	138.6±1.0
2	TPD13	20.0±1.5
3	TPD12	19.5±1.5
4	TPD11	-20.5±1.5
5	TPD10	22.5±1.5
6	C845 (-)	-22.5±1.5
No.	A-Board Test point	Voltage
1	TP41	9.0±0.5
2	TP44	5.0±0.5
3	TP39	3.3±0.3
4	TP54	2.5±0.25
5	TP55	1.8±0.5

15. Service Mode (electronic controls)

This receiver has electronic technology using the IIC bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using “on screen display menu”. (The service adjustment mode.)

NOTE:

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiar with the procedure, the flow chart for service mode may be used as a quick guide.

15.1. Quick entry to service mode:

When minor adjustments need to be done to the electronic controls, the method for entering the service mode without removal of the cabinet back is as follows, using the remote control:

1. Select SET-UP icon, enter “OTHER ADJ.” menu and select CABLE

mode option.

2. Select **TIMER** icon and set **SLEEP** time for 30 Min.
3. Press **“VOL UP ↑ ”** to exit menus.
4. Tune to the Channel 124.
5. Adjust **VOLUME** to minimum (0).
6. Press **VOL ←** (decrease) on receiver. Red **“CHK”** appears in upper corner.

To toggle between aging and service modes:

While the **“CHK”** is displayed on the left top corner of the CRT, pressing **“ACTION”** and **“VOL”** UP on the TV simultaneously will toggle between the modes. Red **“CHK”** for service mode and yellow **“CHK”** for aging.

7. Press **POWER** on the remote control to display the service adjustment modes menu, select adjustment by pressing the **VOL** right/left buttons and **CH** up/down buttons on the remote and **ACTION** to enter the adjustment.

ID:00	480I	480P	1080I	
MODE	DW	JUST	4:3	ZOOM
MTS	MTSIN	SEPAL	SEPAH	
CLOCK	CLOCK			
VIDEO	COLOR	B-Y_G	TINT	R-Y_A
	BRIGH	CONT	CUT R	CUT B
	R DR	B DR	I-ABL	C-OFF
HDEF	H POS	H WID	PCC	TRAP
	BTMG	TOPG		
VDEF	V-AMP	V-C	V-S	
CONV	MUTE	COARS	FINE	
DAF	H-PAR	V-SAW	V-PAR	
OTHER	ACL	HHS		
ID	ID			
EEP	AREA	IN>EX	EX>IN	

15.2. Exiting the service mode:

This PTV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF or unplug the PTV from AC.

Other method

Press **ACTION** and **POWER** on the receiver simultaneously for at least 2 seconds. The receiver momentarily performs a self-check, with a preset level of sound. To completely make an entire reset of the PTV unplug AC cord from AC outlet and plug it back in, then turn PTV power ON. Any programmed channels, channels caption data and some others user defined settings will be erased after performing this reset.

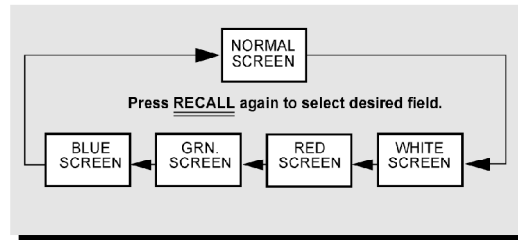
IMPORTANT NOTE

Always check that PTV exits the service mode

To check colors:

Press **RECALL** on the remote control when in service mode (red “CHK” is displayed) to enter the purity field check mode.

Color check



15.3. Service adjustment default values for items

DESCRIPTION	REGISTER	FORMAT	
		NTSC (480i)	HD (1080i)
MTS INPUT LEVEL	MTSIN	21	N/A
LOW SEPARATION	SEPAL	06	N/A
HIGH SEPARATION	SEPAH	19	N/A
CLOCK ADJ	CLOCK	128	N/A
COLOR	COLOR	1F	17
MAGENTA TINT ADJ	B-Y_G	40	46
TINT	TINT	89	82
YELLOW TINT ADJ	R-Y_A	AA	87
SUB-BRIGHTNESS	BRIGH	02 9C	02 C6
SUB-CONTRAST	CONT	03 0E	02 BD
RED CUT-OFF	CUT R	01 C0	01 C0
BLUE CUT-OFF	CUT B	01 C0	01 C0
RED DRIVE	R DR	50	N/A
BLUE DRIVE	B DR	50	N/A
INDIVIDUAL ABL CHECK	I-ABL	VARIABLE	VARIABLE
CUT OFF ADJ	C_OFF	00	00
HORIZONTAL POSITIONING	H POS	04 32	01 83
HORIZONTAL WIDTH	H WID	8A	51
PINCUSHION CORRECTION	PCC	55	40
TRAPEZOID	TRAP	81	81
BOTTOM CORNER PINCUSHION	BTMG	58	B0
TOP CORNER PINCUSHION	TOPG	5A	B4
VERTICAL SIZE	V-AMP	9B	00 94
VERTICAL LINEARITY	V-C	88	87
VERTICAL S CORRECTION	V-S	56	59

DESCRIPTION	REGISTER	FORMAT	
		NTSC (480i)	HD (1080i)
VERTICAL TEST POSITION	TEST POS V	N/A	13
HORIZONTAL TEST POSITION	TEST POS H	N/A	13
LOW PHASE	PHASE LOW	N/A	A0
HI PHASE	PHASE HI	N/A	05
HORIZONTAL OSD POSITION	OSD POS H	N/A	45
VERTICAL OSD POSITION	OSD POS V	N/A	6A
MUTE CONVERGENCE	MUTE	00	00
COARSE ADJ	COARS	00	00
FINE ADJ	FINE	00	00
H DAF ADJUSTMENT	H-PAR	0	0
V SAW DAF ADJUSTMENT	V-SAW	0	0
V DAF ADJUSTMENT	V-PAR	0	0
ID*	ID	00	00
AREA	AREA	FIX	FIX

***IMPORTANT:**

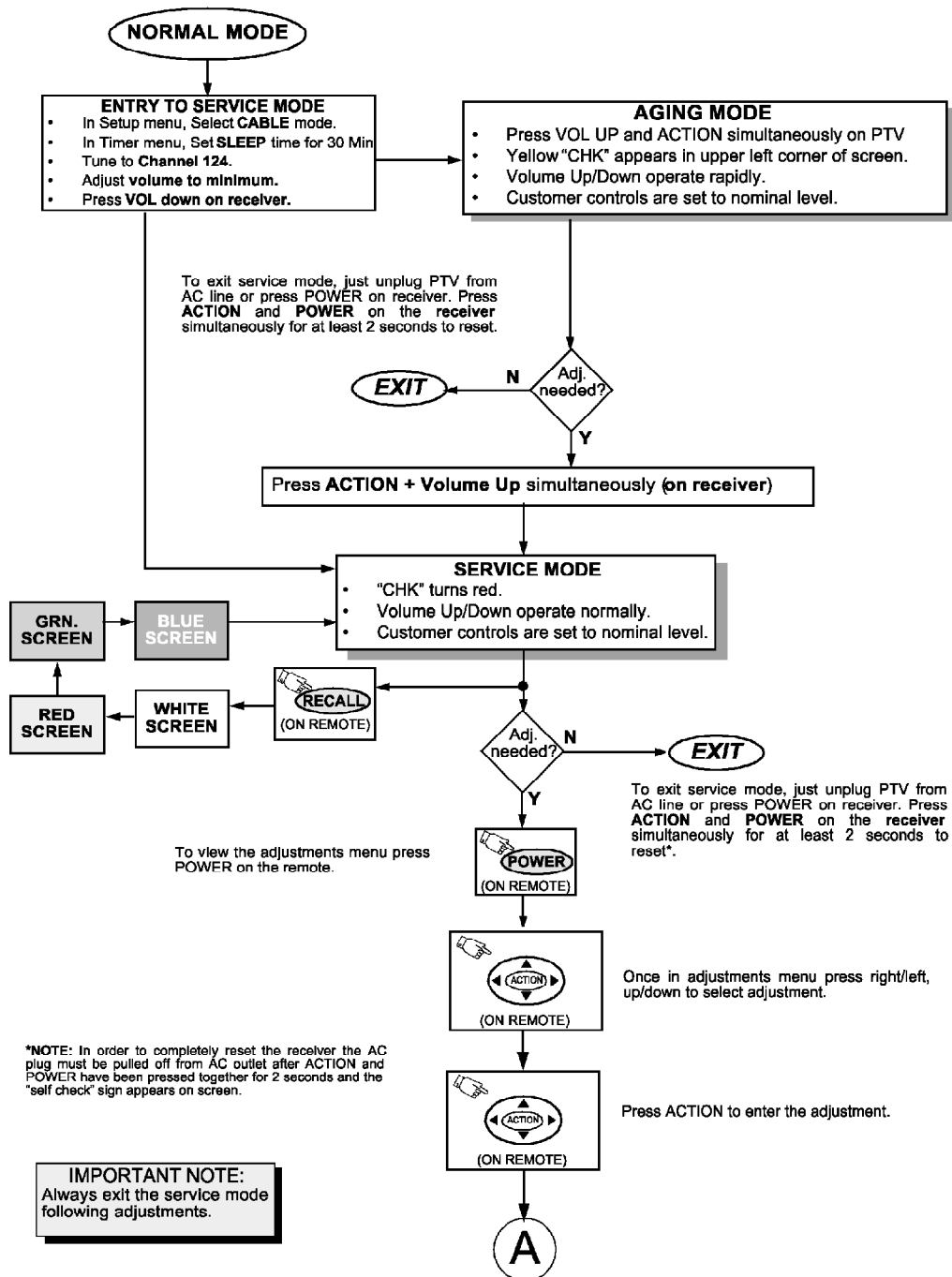
The default ID register value should not be modified in any way, it has been already set to a factory default value specifically for the models listed in this manual.

NOTE:

The above table shows the default values for the service items, this values can change depending on the serviced PTV.

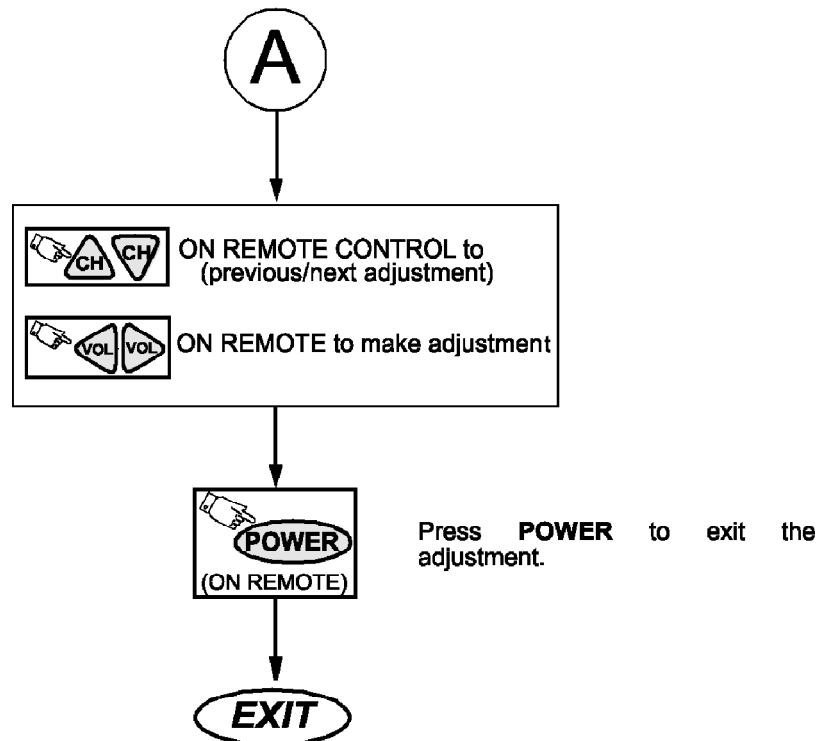
15.4. Instructional flow for service mode.

Instructional flow chart for service mode



15.5. Instructional flow for service mode (continued...)

Instructional flow chart for service mode - (continued)



Press POWER to exit DACs MENU then press ACTION and POWER on the PTV simultaneously for at least 2 seconds to exit service mode and reset*.

*NOTE: In order to completely reset the receiver the AC plug must be pulled off from AC outlet after ACTION and POWER have been pressed together for 2 seconds and the "self check" sign appears on screen.

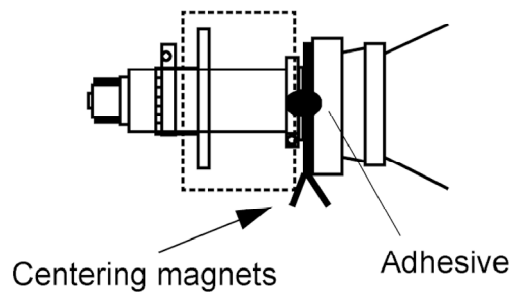
16. CRT Set Up

CAUTION:

Insure that yoke plugs are reconnected on D-Board before turning the PTV ON to prevent damage to the horizontal output transistor and/or CRTs.

1. Connect test generator to the antenna terminal and set for a monoscope pattern.
2. Loosen yoke clamp, seat yoke against bell of CRT and rotate to correct yoke tilt (compare to adjacent CRT). Tighten yoke clamp.
3. Remove adhesive from centering tabs and set centering tabs for zero correction.

Adhesive removal



4. Cover replacement CRT lens and static converge the tubes not replaced, if needed. Check size and linearity of pattern and adjust as required
5. Uncover replacement CRT lens and cover other two CRT lenses. Adjust electrical and optical focus (lens), if required.
6. Uncover all CRT lenses and use yoke centering magnet to converge replacement CRT (in center area of screen only) with other two CRTs. Disregard of convergence in areas other than center area.
7. Perform white balance adjustments.

16.1. Dynamic focus adjustments

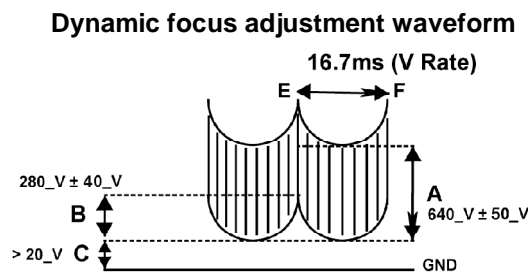
1. Focus adjustments should be performed after 1 hour of aging.
2. Use oscilloscope with 100 : 1 probe.
3. Apply a crosshatch pattern to adjust focus.
4. Adjust the red, blue and green focus VR on the focus block for best focus of overall picture of each CRT.
5. To change DAF DATA, enter to service mode, then press POWER on remote to display DACs menu, then select DAC by pressing CH (RIGHT/LEFT) and VOL (UP/DOWN), then press ACTION to enter to DAC, then adjust by pressing VOL (RIGHT/LEFT); press ACTION, to save press ACTION again or OTHER key to exit without saving.

Procedure:

1. Enter to service mode and set the following default DATA

H-PAR	+390
V-SAW	+2
V-PAR	+20

2. Connect the scope probe to R1522 (D30 side), GND to Q551 heat sink.
3. Confirm that level of A is $640 \pm 50\text{V}$, adjust / “H-PAR” DAC to set to specification level.
4. Confirm that voltage level in D30 is similar between point E and F, if not, adjust V-SAW DAC.
5. Confirm that level of B is $280 \pm 40\text{ V}$, adjust / “V-PAR” DAC to set to specification level.
6. Confirm that level of C is more than 20 V , adjust / “H-PAR” DAC to set to specification level.



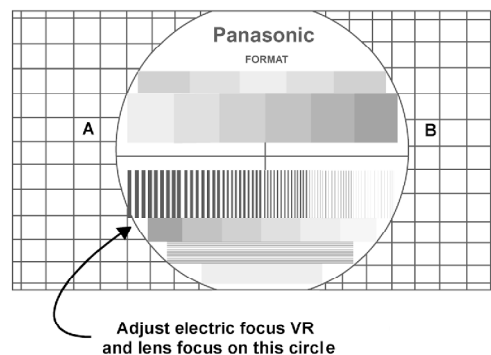
16.2. Focus - Electrical & optical adjustments

(use for minor adjustment or for final adjustment, for complete adjustment see following section.)

Electrical Adjustment

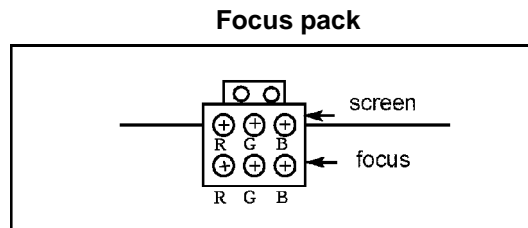
1. Apply a crosshatch with dots pattern.

Lens focus adjustment



	RED	GREEN	BLUE
Electric focus	B	A/B	A
Optical Focus	B	A/B	A

- Set VIDEO “C_OFF” DAC from 00 to 02, and project only red. Adjust red focus VR so that focus is best.



- Adjust red lens focus (mechanical) until focus is best.
- Adjust red focus VR again.
- Set VIDEO “C_OFF” DAC from 02 to 01, and project only green.
- Repeat steps for green only.
- Set VIDEO “C_OFF” DAC from 01 to 03, and project only blue.
- Repeat steps for blue only.

16.2.1. Focus - Optical lens adjustment

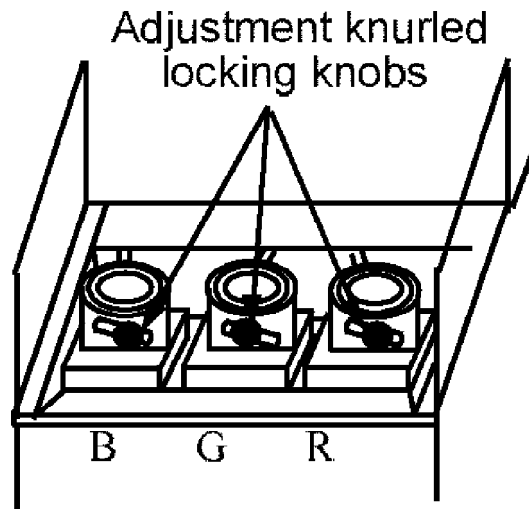
Optical adjustments

NOTE:

This adjustment normally should not require resetting unless the lenses have been replaced or adjustment has changed.

- Optical focus adjustment is located on the top of each CRT lens system. Loosen the adjustment knurled locking knob.

Optical lens focus adjustment



REAR VIEW

2. Turn the PTV ON. Apply and view a crosshatch with dots pattern.
3. Adjust each lens focus for best focus while viewing each CRT.
4. Cover the red and blue CRT, projecting green only. Rotate the green lens for best focus around screen center area.
5. Do the same for the red focus lens while projecting red only.
6. Repeat for blue.
7. Align VM coils.

17. Electronic Adjustments

17.1. Horizontal phase adjustment (H POS)

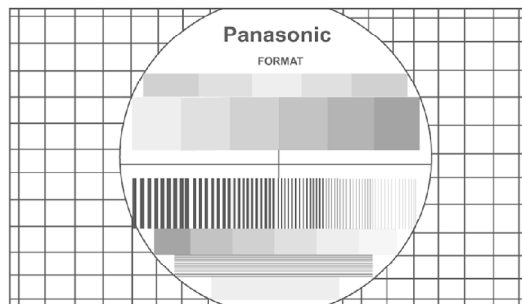
This adjustment is intended to correct the horizontal position of the picture

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a HD 1080i crosshatch pattern that lets adjust the image to correct vertical size (see above note).
2. Adjust electrical and optical focus of red, green and blue colors so that focus is best at the center of screen.
3. Set convergence MUTE DAC from 00 to 01, and confirm disabled convergence.

4. In service mode set VIDEO “C_OFF” DAC from 00 to 01 (to project only green).
5. Set DAC MUTE from 00 to 01 (disabling digital convergence).
6. Turn green deflection yoke until line is perfectly horizontal.
7. Adjust “H POS” DAC data so that pattern is in the center of screen.
8. Enable digital convergence by changing DAC MUTE from 01 to 00.
9. Set VIDEO “C_OFF” DAC from 01 to 00.



17.2. Centering magnets adjustment

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

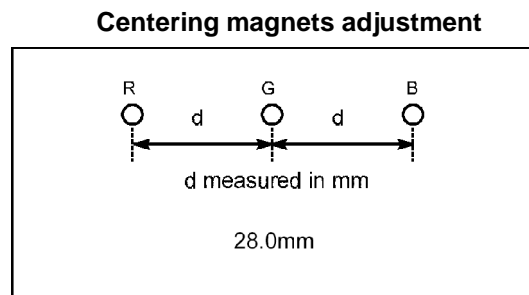
Procedures:

1. Apply a crosshatch pattern with dots.
2. Set VIDEO “C_OFF” DAC from 00 to 01 to project only green.
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Loose the deflection coil screw on the green CRT.
5. Confirm that the horizontal center line is perfectly horizontal to screen frame. If not turn deflection yoke.
6. Adjust green deflection coil until the horizontal center line is horizontal.
7. Adjust centering magnets until the green pattern is equal on left and right. Adjust also for horizontal and vertical tilt.

NOTE:

Push deflection coil to top of CRT neck, then tighten deflection screw after adjusting each CRT centering and tilt.

8. Set VIDEO “C_OFF” DAC from 01 to 03 to project only blue. Adjust deflection coil until the horizontal center line matches the pattern of the grid and is leveled.
9. Adjust blue centering magnets until the pattern center is at the appropriate distance as indicated on the following figure.



10. Set VIDEO “C_OFF” DAC from 03 to 02 to project only red.
11. Adjust red deflection coil until the horizontal center line matches the pattern of the grid and is leveled.
12. Adjust red centering magnets until the pattern center is at the appropriate distance as indicated on figure.
13. Enable digital convergence by changing DAC MUTE from 01 to 00.
14. Set VIDEO “C_OFF” DAC from 02 to 00. Following the adjustment, make sure that all deflection coils are pushed completely toward the CRT cones and that all screws are tightened.

17.3. Pincushion adjustment (PCC)

This adjustment is intended to correct curved sides of the picture.

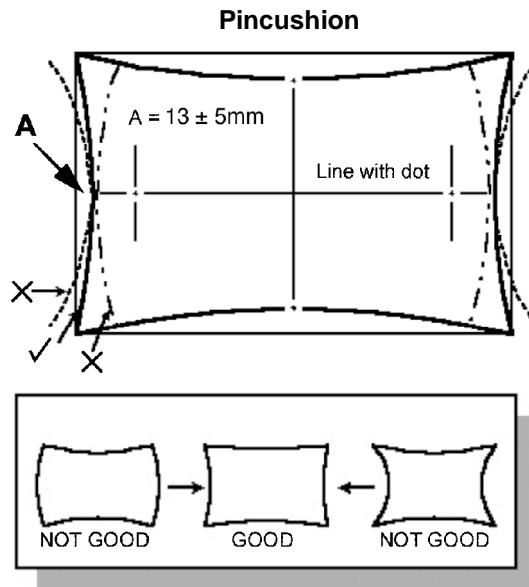
NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

Procedure:

1. Apply a 1080i HD crosshatch pattern that lets adjust the image to correct curved sides (see above note).
2. Set VIDEO “C_OFF” DAC from 00 to 01 to project only green.
3. Set DAC “MUTE” from 00 to 01 (disabling digital convergence).
4. If the distance at “A” is not $13 \pm 5\text{mm}$, enter H DEF “H WID” DAC and adjust with VOLUME UP/DOWN keys until it measures $13 \pm$

5mm.



5. If not all corners of cross hatch appear in screen, enter V DEF “V-AMP” DAC and adjust until they appear.
6. Confirm that measurement of “A” has not changed.
7. Enable digital convergence by changing DAC MUTE from 01 to 00.
8. Set VIDEO “C_OFF” DAC from 01 to 00.

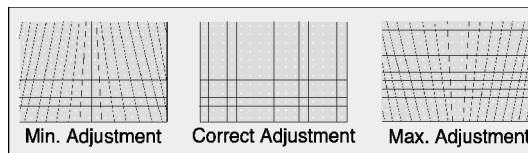
17.4. Trapezoid adjustment (TRAP)

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

Procedure:

1. Apply a 1080i HD crosshatch pattern.
2. Set VIDEO “C_OFF” DAC from 00 to 01 and project only green.
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Enter service mode, select “TRAP” and adjust DATA with VOLUME keys in remote so that lines at right and left are vertical like a solid line.



5. Enable digital convergence by changing DAC MUTE from 01 to 00.
6. Set VIDEO “C_OFF” DAC from 01 to 00.

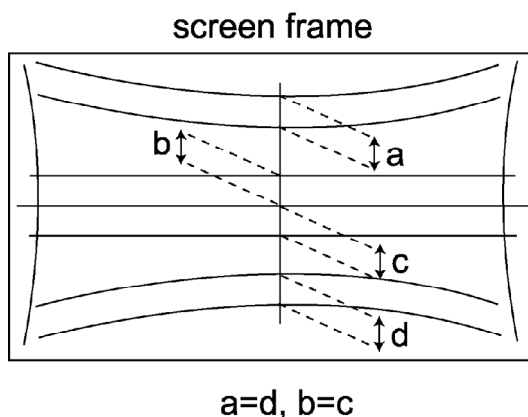
17.5. Vertical linearity adjustment (V-C and V-S)

This adjustment is intended to make the picture vertically proportional (top, center and bottom)

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the image to correct vertical linearity (see above note).
2. Set VIDEO “C_OFF” DAC from 00 to 01 (to project only green).
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Adjust centering magnets so that the center of the pattern get aligned with screen frame center.
5. Adjust VDEF “V-C” and “V-S” DAC until vertical size is proportional on top and bottom. Confirm to correct linearity in the middle of the screen.
6. Set DAC MUTE from 01 to 00 (disabling digital convergence).
7. Set VIDEO “C_OFF” DAC from 01 to 00.



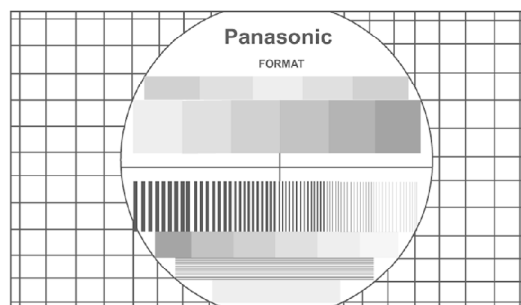
17.6. Vertical size adjustment (V-AMP)

This adjustment is intended to correct the vertical size of the picture.

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the image to correct vertical size (see above note).
2. Set VIDEO "C_OFF" DAC from 00 to 01 (to project only green).
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Adjust centering magnets so that the center of the pattern get aligned with screen frame center.
5. Adjust VDEF "V-AMP" DAC until vertical size is proportional on top and bottom.
6. Set DAC MUTE from 01 to 00 (disabling digital convergence).
7. Set VIDEO "C_OFF" DAC from 01 to 00.



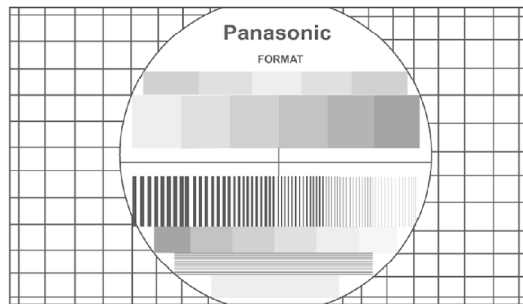
17.7. Horizontal size adjustment / (H_POS)

This adjustment is intended to correct the horizontal position of the picture.

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a 1080i HD pattern that lets adjust the image to correct horizontal position (see above note).
2. Set VIDEO "C_OFF" DAC from 00 to 01 to project only green.
3. Set DAC "MUTE" from 00 to 01 (disabling digital convergence).
4. Turn green deflection yoke until line is perfectly horizontal.
5. Adjust "H WID" DAC data so that pattern has the correct horizontal size.



6. Set DAC MUTE from 00 to 01 (disabling digital convergence).

7. Set VIDEO “C_OFF” DAC from 01 to 00.

17.8. Horizontal size adjustment (H WID)

This adjustment is intended to adjust horizontal width of the picture.

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

- 1. Apply a pattern that lets adjust the horizontal size.**
- 2. Set VIDEO “C_OFF” DAC from 00 to 01 to project only green.**
- 3. Set DAC “MUTE” from 00 to 01 (disabling digital convergence).**
- 4. In service mode, adjust “H WID” DAC until the picture horizontal size is balanced at left and right side of screen.**
- 5. Set DAC “MUTE” from 01 to 00 (disabling digital convergence).**
- 6. Set VIDEO “C_OFF” DAC from 01 to 00.**

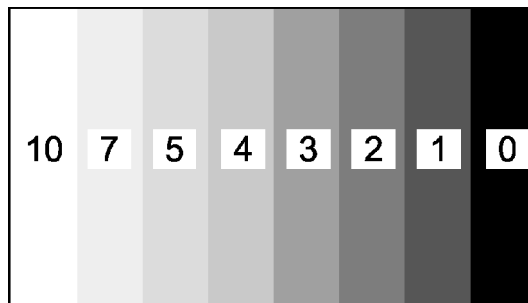
17.9. Sub-Bright adjustment (BRIGH) and ABL check

This adjustment is intended to set 7.5 IRE signal to black level mode.

Procedure:

- 1. Set PICTURE MODE TO VIVID, PICTURE settings to normal, NATURAL COLOR to OFF and COLOR TEMPERATURE to NORMAL.**
- 2. Connect meter (positive lead) to D31 pin 2 and (negative lead) to D31 pin 1.**
- 3. Apply a color bar with no color or if available a grey levels pattern (see picture).**

Gray bar pattern.



4. Adjust DAC “BRIGH” data so that bar 1 becomes near black like bar 0.
5. Apply an HD 1080i signal and repeat this adjustment for HD 1080i mode.
6. To check ABL apply a white pattern and put user bright control (BRIGHTNESS in Picture menu) control to max. and confirm that reading on meter is $12.7 \pm 0.8V$.

17.10. Individual ABL Check (I-ABL)

Procedure:

1. In PICTURE menu set the picture to “NORMAL”.
2. Apply a pure blue flat signal from a signal generator or another source.
3. In service mode select “I-ABL” DAC from service menu.
4. Confirm that the 3 hex values that appear on screen (below the “I-ABL” label) are close to 0, i.e. “00 00 00”
5. If the “I-ABL” values differ too much from 0, repeat bright and ABL adjustment again.

17.11. Red, green & blue screen Cut-Off

1. Use either a no input signal condition or raster from the NTSC generator.
2. Observing the green tube directly or via a reflective surface, adjust the VR on focus pack for the green tube for minimum noise.
3. Adjust the noise level in the red and blue tubes to match the noise level in the green tube.

17.12. White balance adjustment

NOTE:

Use a 7 gray step pattern in this adjustment. This pattern can be obtained from a NTSC generator applying a bar signal without color.

This adjustment requires the service user skills in observing what a screen without color should look like (white picture).

Preparation:

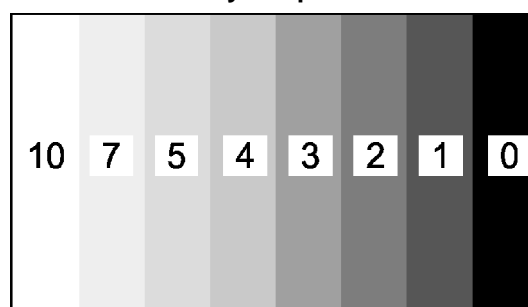
1. Set the following in the user picture menu as follows:

- PIC MODE to VIVID
- COLOR to minimum (0)
- PICTURE to max (63)
- BRIGHT to center (31)
- SHARPNESS to minimum (0)
- TINT to center (31)
- NATURAL COLOR to OFF
- COLOR TEMPERATURE to COOL

1. Enter service mode.

2. Apply a black and white pattern to one of the video inputs (see above note) color bar with no color.

Gray bar pattern.



3. Enter service mode menu, select “C_OFF” register and change value from 00 to 01 to display green color only.

4. Adjust screen VR until bars with 7 and 5 IRE do not have any difference tone between them.

5. Select “C_OFF” register and change value from 01 to 02 to display

red color only.

6. Adjust screen VR until bars with 7 and 5 IRE do not have any difference tone between them.
7. Select “C_OFF” register and change value from 02 to 03 to display blue color only.
8. Adjust screen VR until bars with 7 and 5 IRE do not have any difference tone between them.
9. Select “C_OFF” register and change value from 03 to 03 to display all three colors and check white color.

17.12.1. High light white balance adjustment

1. Adjust DAC R_DR for red and B_DR for blue adjustments.
2. Make sure the screen is not blue or green. The screen should be white in the white area.
3. Check the black and white area for a black and white picture with even shades of gray and no color tint in the picture.

17.12.2. Low light white balance adjustment

1. Adjust DAC CUT_R for red and DAC CUT_B for blue.
2. Check the screen for even white in all areas, no color.
3. Check the black and white pattern for a black and white picture, even shades of gray and no color tint in the low light areas.
4. Repeat the high light and low light white balance again until the white balance tracks from high light to low light.

17.13. Color adjustment (TINT, B-Y_G, R-Y_A)

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

This adjustment requires that the servicer use the skills in observing what a colorbar pattern should look like.

Preparation:

1. Set the following in the user picture menu as follows:

- PIC MODE to VIVID

- COLOR to center (31)
- PICTURE to max (63)
- BRIGHT to center (31)
- SHARPNESS to min. (0)
- TINT to center (31)
- NATURAL COLOR to OFF
- COLOR TEMPERATURE to COOL

Procedure:

1. Apply a color bar pattern
2. Adjust DAC "TINT" so that the fourth bar from right to left becomes purple and good color balance.
3. If the adjustment is high, the bar will look pinkish, if it is low will look bluish.
4. Adjust "B-Y_G" so blue look natural, and the rest of the colors become in balance.
5. Adjust "R-Y_A" so red look natural, and rest of the colors become in balance.
6. Check that white bar is real white, no bluish or reddish or tending to become grey.

17.14. Tint and color check

Set picture mode to VIVID mode. Again, the service ability to see color and the balance of color is important for these adjustments.

Tint check

1. In picture menu set PICTURE NORMAL to YES.
2. Apply color bars to the video input.
3. Magenta is composed of two colors, blue and red.
4. Check to see that magenta does not have too much blue or too much red.
5. Check cyan. Cyan is composed of blue and green. It should not have too much blue or green.

6. Use a test signal from a VCR or DVD disk that has a pre-recorded close up of a signal that has good flesh tones.
7. The signal from the VCR or DVD player should look normal.

Color Check

Using a clean RF or video signal, set the color level so that it does not saturate or appear harsh. Make sure that color is not set so that it appears dull and washed out. Look for natural colors, try to adjust the picture to appear as a normal photograph.

17.15. MTS circuit adjustment

Note:

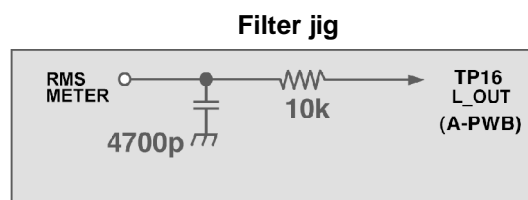
It is important to adjust the MTS circuit in the order shown below. The MTS circuit adjustment require two steps:

1. Input level adjustment.
2. Stereo separation adjustment.

Input level adjustment (MTSIN)

Preparation:

1. Connect an RMS meter (A.C. range) with filter jig as shown:



2. Connect an RF signal generator to the RF antenna input.

Procedure:

1. Apply the following signal from the RF signal generator: / Video: 100 IRE flat field, 30% modulation. / Audio: 300Hz, 100% modulation, monaural ($70 \pm 5\text{dB}$, 75Ω open, P/S 10dB). Make sure to turn off 75 μ s pre-emphasis.
2. Adjust DAC "MTSIN" MTS-INPUT data until the voltage measured is $106 \pm 6.0\text{mV RMS}$.

Stereo separation adjustment (SEPAL & SEPAH)

Preparation:

- 1. Connect an RF signal generator to the RF antenna input.**
- 2. Connect an oscilloscope probe to TP17 (R_OUT, A-board).**

Procedure:

- 1. Set PTV to Stereo Mode (in the audio menu).**
- 2. Apply the following signal from the RF signal generator: / Video: 100 IRE flat field, 30% modulation. / Audio: 300Hz, 30% modulation, stereo (left only) (70dB \pm 5dB, 75 Ω OPEN, P/S 10dB).**

Note:

Set the 30% modulation with the pilot light SW and N.R. switches OFF then turn them ON while testing.

- 3. Adjust MTS low level separation "SEPAL" DAC data (in the service menu) until the amplitude of the measured waveform on the scope is minimum.**
- 4. Apply the following signal from the RF signal generator: / Video: 100 IRE flat field, 30% modulation. / Audio: 3KHz, 30% modulation, stereo (left only). / (70dB \pm 5dB, 75 Ω OPEN, P/S10dB).**

Note:

Set the 30% modulation with the P.L and N.R. switches OFF then turn them ON while testing.

- 5. Adjust MTS High Level Separation "SEPAH" DAC data until the amplitude of the waveform measured on the scope is minimum.**
- 6. Repeat above steps 2 through 5 until the amplitude is at minimum for both signals.**

17.16. Clock Adjustment (CLOCK)

Preparation:

Connect the frequency counter from TP24 (A-Board) to cold ground.

Note:

Frequency Counter probe capacitance should be 8pF or less.

Procedure:

1. Turn the PTV “ON” with the A.C. power applied.
2. Measure TP24 (A-Board) for frequency and record the reading.

Note:

Pin measurement must have at least four digits of resolution following the decimal point. Example : 000.0000

3. Place the PTV into service mode for making electronic adjustment, select the clock adjustment DAC CLOCK and change value to 128.
4. Calculate and set CLOCK based on the following formula:

$$CLOCK = 128 + 0.450 \times 106 \times \left\{ \frac{732.422 - TP24 [Hz]}{732.4220} \right\}$$

Note:

TP24 measurement will not change regardless of the value stored in CLOCK.

18. Convergence adjustment

Turn PTV on and allow it to warm up for 30 minutes prior to perform adjustments (apply a WHITE PATTERN).

Helpful Hint:

EEPROM jig can be used to adjust convergence, by copying convergence adjustment from a convergence adjusted PTV to other. Refer to EEPROM copy jig section on this service manual. Also EEPROM copy jig can be used to back-up the data before to perform adjustments.

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

IMPORTANT NOTICE:

It is strongly recommended to first read and understand the following section prior to make any

adjustment.

This PTV uses the scheme described below to correct for misconvergence of the three CRT projection tubes. There are various modes to this operation.

Preparation:

Place the convergence alignment template (see Convergence alignment template section on this manual) over the PTV screen. Align the center lines of the template with the mechanical center markers on the PTV screen frame. If the template is not available, create one using the dimensions provided in Convergence alignment template section on this manual. Remote control must be used during the procedure.

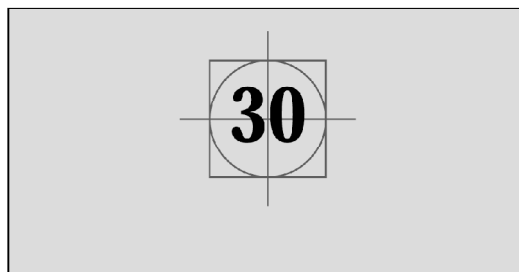
Procedure:

Apply the convergence alignment template to the PTV screen frame to converge the green raster only. Remove the convergence alignment template following this alignment. The red and blue rasters can then be aligned to the green raster.

Raster Set-Up:

1. Enter to service mode (red CHK).
2. In SET-UP (menu) enter to "Other Adj." menu and set CONVERGENCE values (GH, GV) to 0.
3. Cover red & blue lens with caps.
4. Apply a pattern to adjust with 1080i HD format:
5. Select "COARSE" DAC, then press ACTION to enter to "Coarse adjustment" mode.
6. Press "0" key on remote.
7. Press ACTION key on remote to enter to "TEST_POS" mode.
8. Move pattern by pressing VOL right - left and CH up - down so that the cursor center overlap monoscope pattern center.

Aligned cross-hair pattern with center of picture pattern



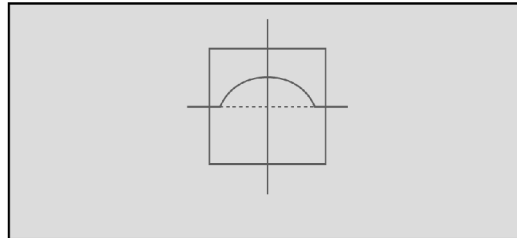
9. Press "5" key on remote to exit superimpose mode (monoscope

pattern disappear).

10. Press “TV/VIDEO” key to enter “DATA_POS” mode

11. Adjust by pressing VOL right - left so that peak of curve is the same position as center of cursor.

Symmetrical shape



12. Press “TV/VIDEO” key on remote to enter “OSD_POS” mode.

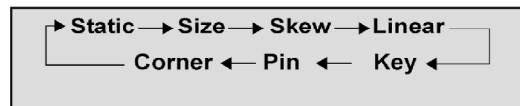
13. Press “5” key on remote so that monoscope pattern appears (superimpose mode)

14. Move cursor by pressing VOL right - left and CH up - down so that cursor center overlap monoscope pattern center

15. Press “0” key to go back to “Coarse adjustment” mode.

16. Press “TV/VIDEO” key to cycle through “Coarse adjustment” options

“COARSE” modes cycle



17. To change to “Fine Adjustment Mode” options (“FINE” DAC), press “TV/VIDEO” key on remote for at least 3 seconds, to go back to “Coarse

Adjustment Mode” options press “TV/VIDEO” on remote again for 3 seconds.

18. In “Fine Adjustment Mode” options, press “MUTE” key on remote to switch between “cursor” mode and “data” mode.

- Cursor mode: Allows cursor movement by pressing VOL right - left and CH up - down.
- Data mode: Allows making adjustment by pressing VOL right - left and CH up - down.

19. Either “Coarse Adjustment” options or “Fine Adjustment” options, press “R-TUNE” repeatedly key on remote to cycle through different color adjustments (R, G, B, White)
20. In “Fine Adjustment” options, press “4” key on remote to ADD crossed sections to pattern and make effect visible between crossed sections.
21. To store adjustments press “7”, then “ACTION” key on remote, otherwise press “POWER” then “ACTION” to exit adjustments without saving.
22. Once out of the “COARSE” register, “AUTO OFFSET” process begins by comparing red, green and blue color adjustment with the internal PTV convergence sensors.
23. For Remote functions, PRESS:

PRESS BUTTON	TO
1(forward) or 3(back)	change viewed color
2	change pattern
4 (only FINE mode)	change crossed sections
5	overlap
* 7	save data
8	copy from
9	clear
POWER	exit
RECALL	display values
R-TUNE	cycle colors
TV/VIDEO	change mode
TV/VIDEO (3 secs)	switch convergence mode (FINE/ COARSE)

*

When “7” is pressed and the data is saved, it will overwrite the factory default.

18.1. Coarse adjustment mode (COARS)

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

NOTE:

It is strongly recommended to first read and understand the following section prior to make any adjustment. / Convergence adjustment must be performed for 480i_p (same for interlace & progressive), ZOOM 480i and 1080i.

Procedure:

1. Enter to “G-SIZE” mode:

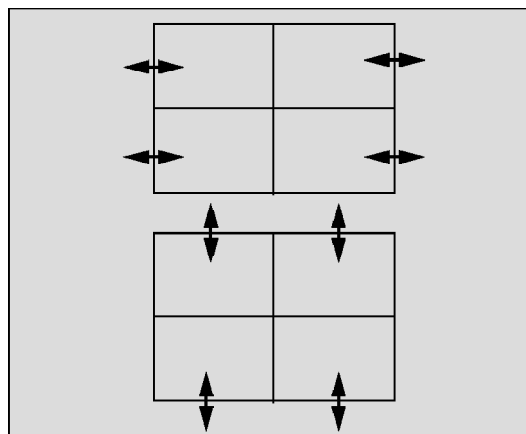
- Select “COARSE” DAC
- Press ACTION on remote
- TV/VIDEO (repeatedly)
- R-TUNE (repeatedly)

2. Press “2” repeatedly and apply the pattern of border and cross.

3. Press “RECALL” key to display values

4. Adjust size so that the line of the border closes to the screen frame at top, bottom, left and right, by pressing CH up-down and VOL right-left

“SIZE” mode adjustment

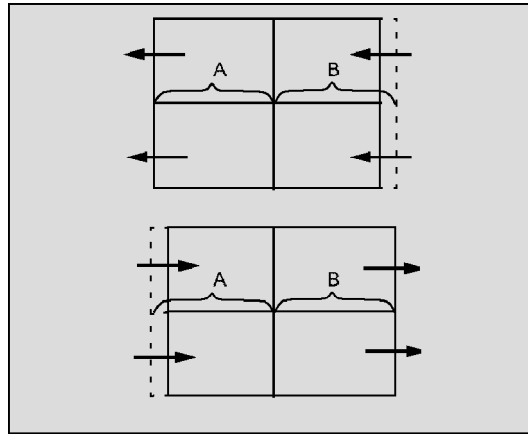


5. Press “7” then “ACTION” key on remote to save changes.

6. Enter to linearity “G-LINEAR” mode by pressing “TV/VIDEO”.

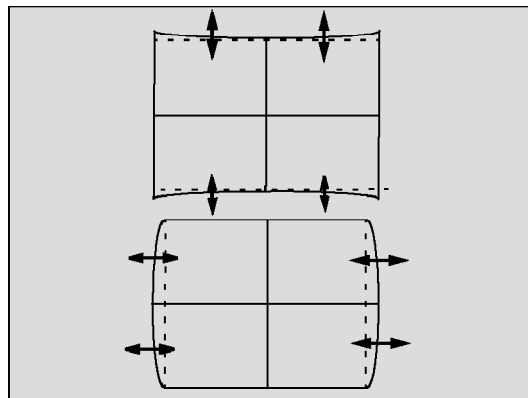
7. Adjust linearity by pressing VOL right-left until A=B.

“LINEAR” mode adjustment



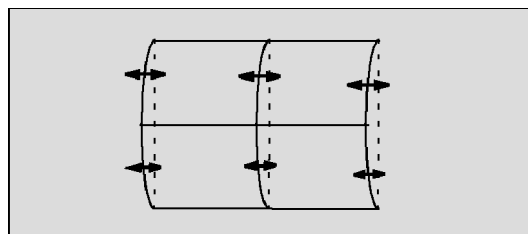
8. Press “7” then “ACTION” key on remote to save changes.
9. Enter to PIN “G-PIN” mode by pressing “TV/VIDEO”
10. Adjust V_PIN by pressing CH up-down (see figure)
11. Adjust H_PIN by pressing VOL right-left.
12. Press “7” then “ACTION” key on remote to save changes

“PIN” mode adjustment



13. Press “7” then “ACTION” key on remote to save changes.
14. Adjust by pressing VOL right-left (see figure)
15. Press “7” then “ACTION” key on remote to save changes

“CORNER” mode adjustment

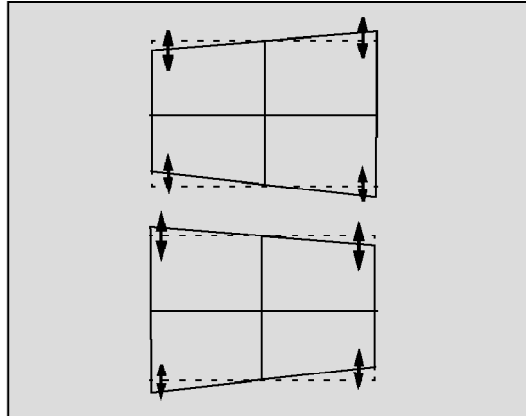


16. Enter to KEY “G-KEY” mode by pressing TV/VIDEO.

17. Adjust by pressing CH up-down (see figure)

18. Press “7” then “ACTION” key on remote to save changes

“KEY” mode adjustment



NOTE:

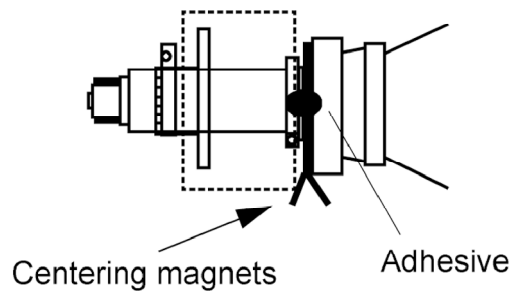
Confirm that pattern looks like a square and almost overlaps the screen frame, check that vertical and horizontal line center match with the marks on screen frame, if linearity is not good enough, repeat adjustments.

19. Enter to “STATIC” mode by pressing TV/VIDEO.

20. Press “1” or “3” repeatedly until green and red only are shown.

21. Adjust “R-STATIC” so that the center of red overlaps with the center of green

“STATIC” mode adjustment

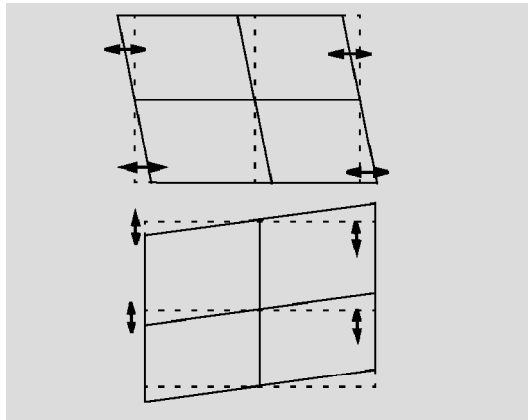


22. Enter to SKEW “R-SKEW” mode by pressing TV/VIDEO

23. Adjust “R-SKEW” so that the vertical and horizontal line of center overlaps with green (see figure)

24. Press “7” then “ACTION” key on remote to save changes.

“SKEW” mode adjustment

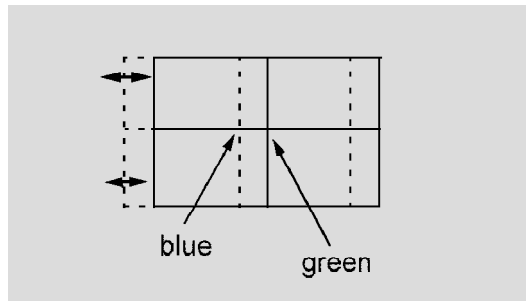


NOTE:

Remember always save data following each adjustment by pressing “7” key on remote, then ACTION.

25. Enter to LINEARITY “R-LINEAR” mode by pressing TV/VIDEO.
26. Adjust Horizontal linearity (see figure)
27. Enter to SIZE “R-SIZE” mode by pressing TV/VIDEO.
28. Adjust so that the line on the border closes to the screen frame at top, bottom, left and right (see figure).
29. Enter to PIN “R-PIN” mode by pressing TV/VIDEO
30. Adjust horizontally and vertically (see figure)
31. Enter to CORNER “R-CORNER” mode by pressing TV/VIDEO.
32. Adjust corners (see figure).
33. Enter to KEY “R-KEY” mode by pressing TV/VIDEO
34. Adjust KEY (see figure).
35. Display pattern of border and cross, then check that red overlaps green pattern, if it is not satisfactory, repeat from step 19.
36. Enter to STATIC “B-STATIC” mode.
37. Press “1 or 3” key repeatedly on remote until only green and blue pattern are displayed.
38. Adjust B-STATIC so that the center of blue overlaps with the center of green (see figure).

“B-STATIC” mode adjustment



39. Perform all adjustments for blue (B-SKEW, B-LINEAR, B-SIZE, B-PIN, B-CORNER, B-KEY)
40. Display border and cross pattern and confirm that blue overlaps with green pattern, if it is not satisfactory, repeat for blue.
41. Press “1 or 3” key repeatedly on remote until green, red and blue (white), confirm that red and blue overlaps with green pattern.
42. Press “7” key on remote, then ACTION to save changes.
43. Press POWER then ACTION to exit adjustments or press TV/VIDEO for at least 3 seconds to change to Fine Adjustment Mode.
44. After exiting COARS adjustment the “AUTO OFFSET” procedure begins. The receiver performs an horizontal and vertical sweeping offset reference with the new saved data for autoconvergence alignment feature (see “autoconvergenceadjustment” for more information).

18.2. Fine adjustment mode (FINE) (convergence)

NOTE:

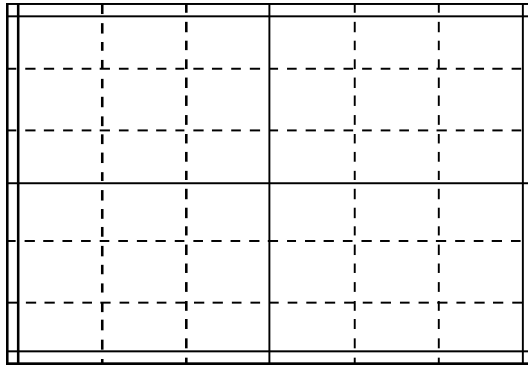
It is strongly recommended to first read and understand the following section prior to make any adjustment.

HELPFUL HINT:

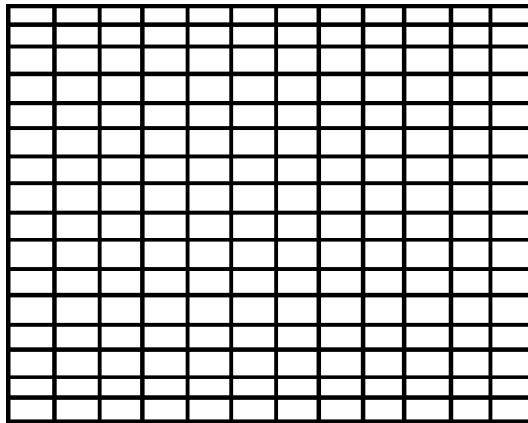
The easiest way to adjust convergence is to start adjusting from the center of the screen to the borders in all the convergence adjustments.

Once in “FINE” convergence mode press “4” on remote control frequently to change crossed sections, this helps to check convergence more accurate in more sections of the picture. Please see the following figures that show the cycle, this does not have any effect on the positions of the cursor.

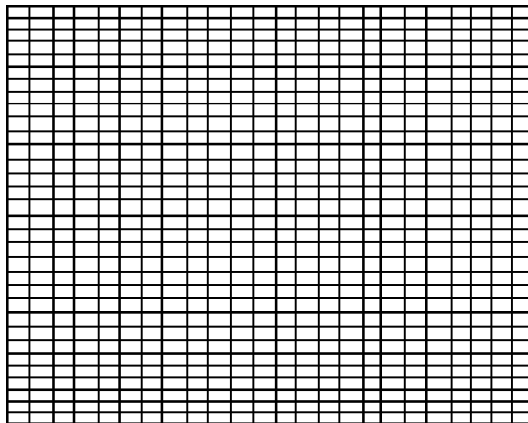
“FINE” convergence mode default Grid



“FINE” convergence mode after pressing “4” on remote



“FINE” convergence mode after pressing “4” on remote



PRESS BUTTON	TO
1(go) or 3(back)	change color view
2	change pattern
4 (only FINE mode)	change crossed sections
5	overlap
* 7	save data
8	copy from
9	clear
POWER	exit
RECALL	display values
R-TUNE	cycle colors
TV/VIDEO	change mode
TV/VIDEO (3 secs)	switch convergence mode (FINE/ COARSE)

*

When “7” is pressed and the data is saved, it will overwrite the factory default.

In “FINE ADJUSTMENT MODE” options, press “MUTE” key on remote to switch between “cursor” mode and “data” mode.

- **Cursor mode (cursor flashing):** Allows cursor movement by pressing VOL right - left and CH up - down.
- **Data mode (cursor fixed):** Allows making adjustment by pressing VOL right - left and CH up - down.

PROCEDURE:

1. To Enter to “G-EASY” mode (for green):

- Select “FINE” DAC
- Press ACTION on remote
- Press TV/VIDEO (repeatedly) to select mode.
- Press R-TUNE (repeatedly) to select color

2. Press “2” repeatedly and apply the pattern of crosshatch.

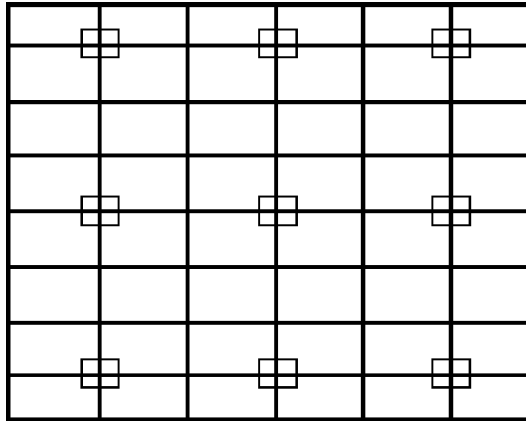
3. Press “4” frequently to change crossed sections, this helps to check convergence more accurate in more sections of the picture.

4. Press “1 or 3” repeatedly until the pattern becomes green.

5. Press RECALL to display values.

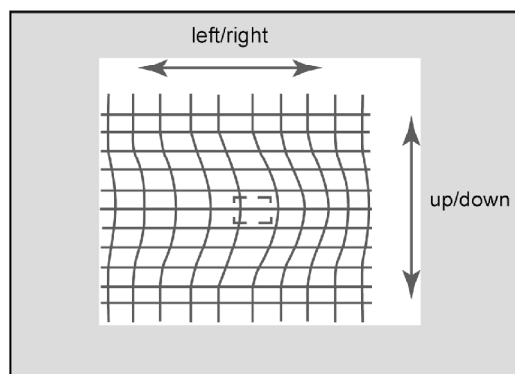
6. In “EASY” mode, the adjustment value changes by 4 steps
7. “EASY” mode allows to move lines horizontally and vertically from the center of cursor

“EASY” mode adjustment, possible locations for cursor



8. This mode affects a wide area around the cursor than other adjustment modes, See values on screen by pressing RECALL on remote
9. Begin adjustment from the center to the edge of the screen.
10. Adjust when the cursor is not flashing by pressing CH up/down and VOL right/left on the remote control, if the cursor is flashing press MUTE on remote.

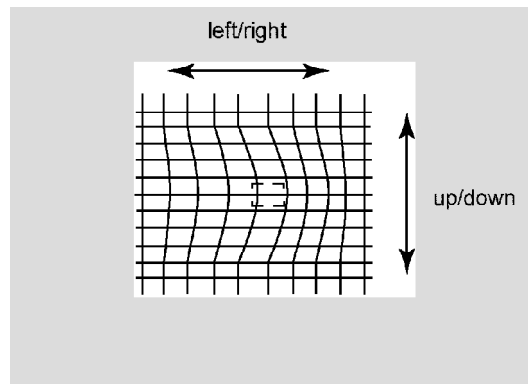
“EASY” mode adjustment



11. To move the cursor press MUTE on the remote (cursor flashes), then move the cursor to any of the positions for “EASY” mode
12. This adjustment may help to make rounded lines become straight lines.
13. Adjust to make lines as straight as possible.

14. Enter to POINT “G-POINT” (for green) mode by pressing TV/VIDEO.
15. “POINT” mode allows to move line horizontally and vertically from the perimeter of cursor making rounded lines become straight
16. In “POINT” mode, the adjustment data changes by 2 steps, See values on screen by pressing RECALL on remote
17. When the cursor is located in the outer area of the border the cursor starts to flash from one side to other, the location is for the non-visible area and the most outer side of screen (inside the ovals area, see figure); This applies to “LINE”, “POINT” & “ORIGIN.POINT” modes.
18. Begin adjustment from the center to the edge of the screen

“POINT” & “ORIG. POINT” mode adjustment

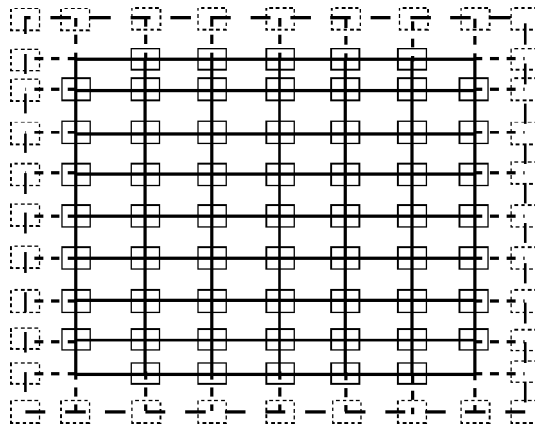


19. Adjust to make lines as much straight as possible
20. When slightly adjustment is needed, use “ORIG. POINT” mode.
21. To enter to “G-ORIG. POINT” (for green) mode press TV/VIDEO.
22. With “ORIG. POINT”, the adjustment data changes by 1 step, this allows more detail in the adjustment. Display values on screen by pressing RECALL on remote
23. Confirm that green adjustment is good enough, if adjustment is not satisfactory, repeat adjustments.
24. Enter to LINE “G-LINE” mode by pressing TV/VIDEO.
25. LINE mode allows to move each single line horizontally and vertically (see figure)

26. Begin adjustment from the center to the edge of the screen (see figure)

27. Adjust to make distribute lines

LINE, POINT, ORIG. POINT modes, possible locations for cursor

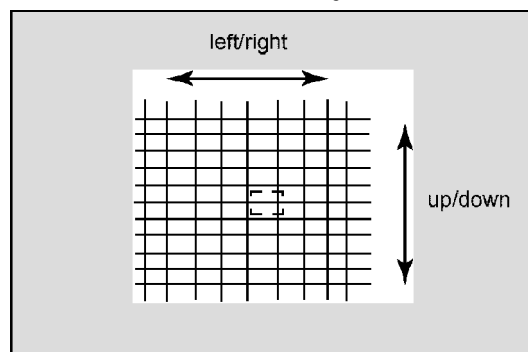


28. Then press “1 or 3” on the remote until red and green appears.

NOTE:

Since convergence adjustment will not allow to adjust every single cross section of the grid, it is very important to adjust, so that overall looks best, in “FINE” mode press “4” frequently on remote control to cycle crosshatch pattern to verify convergence.

“LINE” mode adjustment



29. Perform adjustments for red so that red overlaps green, do not move green.

30. Press “1 or 3” on the remote until yellow (red and green) and blue appears, do not move green or red.

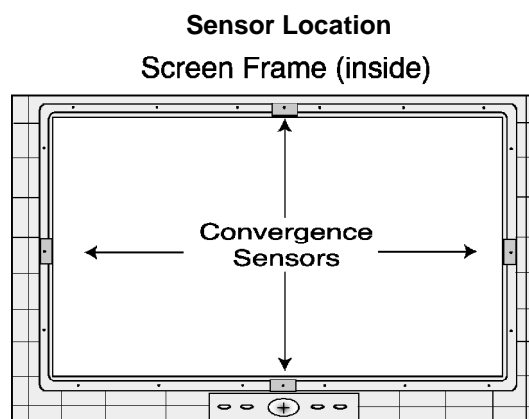
31. Perform adjustments so that blue overlaps Yellow (red and green).

32. Press “1 or 3” key on remote to display red, green and blue (white).

33. At this point the crosshatch pattern should look white.
34. If the crosshatch pattern is not only white, repeat adjustment for that specific color (red or blue).
35. Once the crosshatch pattern looks only white, perform the adjustments for White only ("POINT", "ORIG. POINT" & "LINE"), notice that each adjustment must be only for white (red, green, blue)
36. Adjust white for a good line distribution and make lines completely straight.
37. Press "7" key on remote, then ACTION to save changes.
38. Press POWER then ACTION to exit convergence adjustments (DACs menu appears).
39. After exiting FINE adjustment the "AUTO OFFSET" procedure begins. The receiver performs an horizontal and vertical sweeping offset reference with the new saved data for autoconvergence alignment feature (see "autoconvergenceadjustment" for more information).

18.3. Autoconvergence adjustment

The GN1P family has a special feature that performs an autoconvergence quick adjustment with a 4 point optical reference pattern. To perform this automatic adjustment the receiver must sweep 4 line reference pattern(2 horizontal and 2 vertical)for all 3 colors (red, green and blue). The receiver capture the light sweep alignment with 4 optical sensors inside the screen frame perimeter.



In Service mode:

In case that autoconvergence adjustment does not give proper convergence alignment results repeat manual convergence adjustment procedure.

Autoconvergence Troubleshoot (ERROR display)

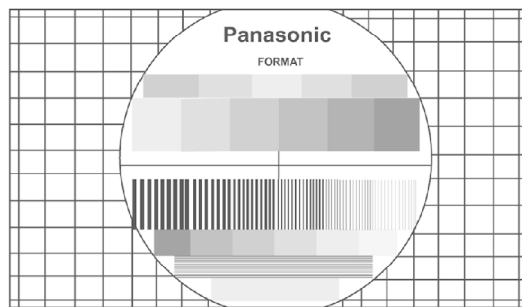
When autoconvergence feature is executed and the procedure doesn't complete accordingly by displaying an error number on screen, check the possible causes in the following order:

1. Make sure convergence and electrical adjustments are properly set.
2. Check all chassis connections.
3. Check that Autoconvergence patterns are centered and displayed correctly.
4. Check that K-board is properly connected.
5. Check that optical sensors (screen frame) are properly connected and working. Check the following error table for possible optical sensor malfunction or bad connection. In case of malfunction, replace optical sensor (CD-board).

Error display	Description	Error display	Description
A0	Left sensor did not detect horizontal red.	A1	Left sensor did not detect vertical red.
A8	Top sensor did not detect horizontal red.	A9	Top sensor did not detect vertical red.
B0	Bottom sensor did not detect horizontal red.	B1	Bottom sensor did not detect vertical red.
B8	Right sensor did not detect horizontal red.	B9	Right sensor did not detect vertical red.
A2	Left sensor did not detect horizontal green.	A3	Left sensor did not detect vertical green.
AA	Top sensor did not detect horizontal green.	AB	Top sensor did not detect vertical green.
B2	Bottom sensor did not detect horizontal green.	B3	Bottom sensor did not detect vertical green.
BA	Right sensor did not detect horizontal green.	BB	Right sensor did not detect vertical green.
A4	Left sensor did not detect horizontal blue.	A5	Left sensor did not detect vertical blue.
AC	Top sensor did not detect horizontal blue.	AD	Top sensor did not detect vertical blue.
B4	Bottom sensor did not detect horizontal blue.	B5	Bottom sensor did not detect vertical blue.
BC	Right sensor did not detect horizontal blue.	BD	Right sensor did not detect vertical blue.

18.4. Horizontal and vertical size check

1. Apply a pattern that permits to check that horizontal and vertical proportion of the image is correct
2. Confirm that horizontal and vertical center of the picture is located in the center of the screen.
3. Check that the image is proportional horizontally and vertically, proportion is different on every aspect.



18.5. Convergence alignment template

The convergence alignment template is a grid approximately the size of the viewing screen used to ensure the proper size and shape of the alignment rasters. It is 6 blocks across by 6 blocks high. Apply a convergence alignment template to the viewingscreen of the PTV. Make sure the center lines are properly aligned. If a template is not available, one can be created by following the instructions below. Create a convergence alignment template by drawing a pattern, as in the figure, in the actual dimensions on transparent film or tracing paper. Start with the Horizontal and Vertical Center Axis and work outwards until the pattern is complete. Pay attention to the actual dimensions of the pattern.

Template dimensions:

- 53": 1173.3mm horizontal x 660mm vertical.

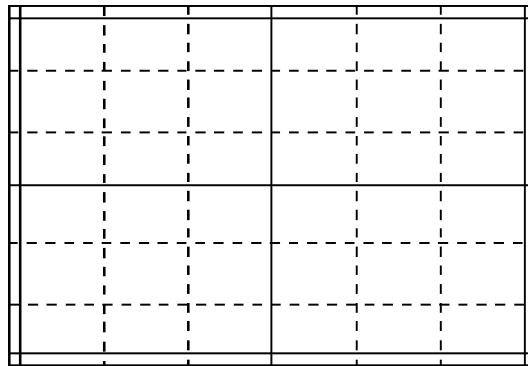
Single grid dimension:

HORIZONTAL	VERTICAL
189.22 mm	94.29 mm

NOTE:

A convergence alignment template, part number TXFQD01FSER is available through Matsushita/Panasonic Services

Convergence template.



19. Reference of PDF links color

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
SCHEMATIC	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
PCB	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
BLOCK DIAGRAMS	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

20. Conductor views

20.1. A-Board Printed Circuit (page 1 of 2)

20.2. A-Board Printed Circuit (page 2 of 2)

20.3. D-Board Printed Circuit (page 1 of 2)

20.4. D-Board Printed Circuit (page 2 of 2)

20.5. DC-Board Printed Circuit (Top & bottom view)

20.6. DG-Board Printed Circuit (bottom view)

20.7. DG-Board Printed Circuit (top view)

20.8. H-Board Printed Circuit

20.9. CD, G, K & R Printed Circuit Boards

20.10. LB-Board Printed Circuit

20.11. LG-Board Printed Circuit

20.12. LR-Board Printed Circuit

21. Block diagrams

21.1. Audio block diagram page (1 of 2)

21.2. Audio block diagram (page 2 of 2)

21.3. Video block diagram (page 1 of 2)

21.4. Video block diagram (page 2 of 2)

22. Schematic diagrams

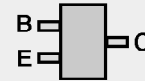
22.1. Schematic diagrams notes

Notes:

IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A Δ IN THE SCHEMATIC.

CHIP TRANSISTOR LEAD DESIGNATION



SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
 - Capacitors are ceramic 50V unless noted otherwise.
 - Coil value notes is inductance in μ H.
 - Test point indicated by \uparrow ; Test point but no pin \uparrow .
 - Components indicated with Δ are critical parts and replacement should be made with manufacture specified replacement parts only.
 - (BOLD LINE) indicates the route of B+ supply.
 - The schematic diagrams are current at the time of printing and are subject to change without notice.
 - Ground symbol \downarrow indicates **HOT GROUND CONNECTION**; \uparrow indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

VOLTAGE MEASUREMENTS

- Voltage measurement:
 - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
 - All Picture and Audio adjustments are set to Normalize.
 - TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode
 - Volume - Min.
 - TV/Video SW - TV position
 - Audio Mode - Stereo
 - Voltage readings are nominal and may vary $\pm 10\%$ on active devices. Some voltage reading will vary with signal strength and picture content.
 - Supply voltages are nominal.
 - Ground symbol \downarrow indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

WAVEFORM MEASUREMENTS

- $\textcircled{3}$ indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
 - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
 - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
 - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 1). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
 - Ground symbol \downarrow shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



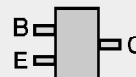
22.2. Notas de los diagramas esquemáticos

Notas

NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRÍTICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRÍTICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SÍMBOLO \triangle .

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP



NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W, a menos que se indique otra característica.
 - Los Capacitores son de Cerámica para 50V, a menos que se indique otra característica.
 - El valor indicado de las Bobinas es la inductancia expresada en μ H.
 - Los puntos de prueba en la terminal de algún componente son indicados por \uparrow . Los puntos de prueba fuera de los componentes se indican con \uparrow .
 - Los componentes señalados con el símbolo \triangle son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
 - (LINEA GRUESA)** indica las líneas de alimentación de los Voltajes B+.
 - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
 - El símbolo \downarrow indica que es una conexión a **Tierra Caliente** y el símbolo \uparrow indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

MEDICIÓN DE VOLTAJES

- Medición de voltaje:
 - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
 - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
 - Las fuentes de voltajes son nominales.
 - El símbolo \downarrow indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como ③ indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
 - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EAI, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
 - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se ajusta al mínimo.
 - banda alta y con un punta de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
 - El símbolo de tierra \downarrow que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

ajusta al mínimo. 4. Las formas de onda de Video y Color fueron tomadas con un osciloscopio de	<i>mediciones equivocadas y podría dañar el equipo de medición.</i>
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22.3. A-Board schematic 1 of 3

22.4. A-Board schematic 2 of 3

22.5. A-Board schematic 3 of 3

22.6. D-Board schematic 1 of 5

22.7. D-Board schematic 2 of 5

22.8. D-Board schematic 3 of 5

22.9. D-Board schematic 4 of 5

22.10. DC-Board schematic 1 of 2

22.11. DC-Board schematic 2 of 2

22.12. DG-Board schematic 1 of 11

22.13. DG-Board schematic 2 of 11

22.14. DG-Board schematic 3 of 11

22.15. DG-Board schematic 4 of 11

22.16. DG-Board schematic 5 of 11

22.17. DG-Board schematic 6 of 11

22.18. DG-Board schematic 7 of 11

22.19. DG-Board schematic 8 of 11

22.20. DG-Board schematic 9 of 11

22.21. DG-Board schematic 10 of 11

22.22. DG-Board schematic 11 of 11

22.23. CD,G, K, & R Boards schematics

22.24. H-Board schematic

22.25. LB-Board schematic 1 of 2

22.26. LB-Board schematic 2 of 2

22.27. LG-Board schematic 1 of 2

22.28. LG-Board schematic 2 of 2

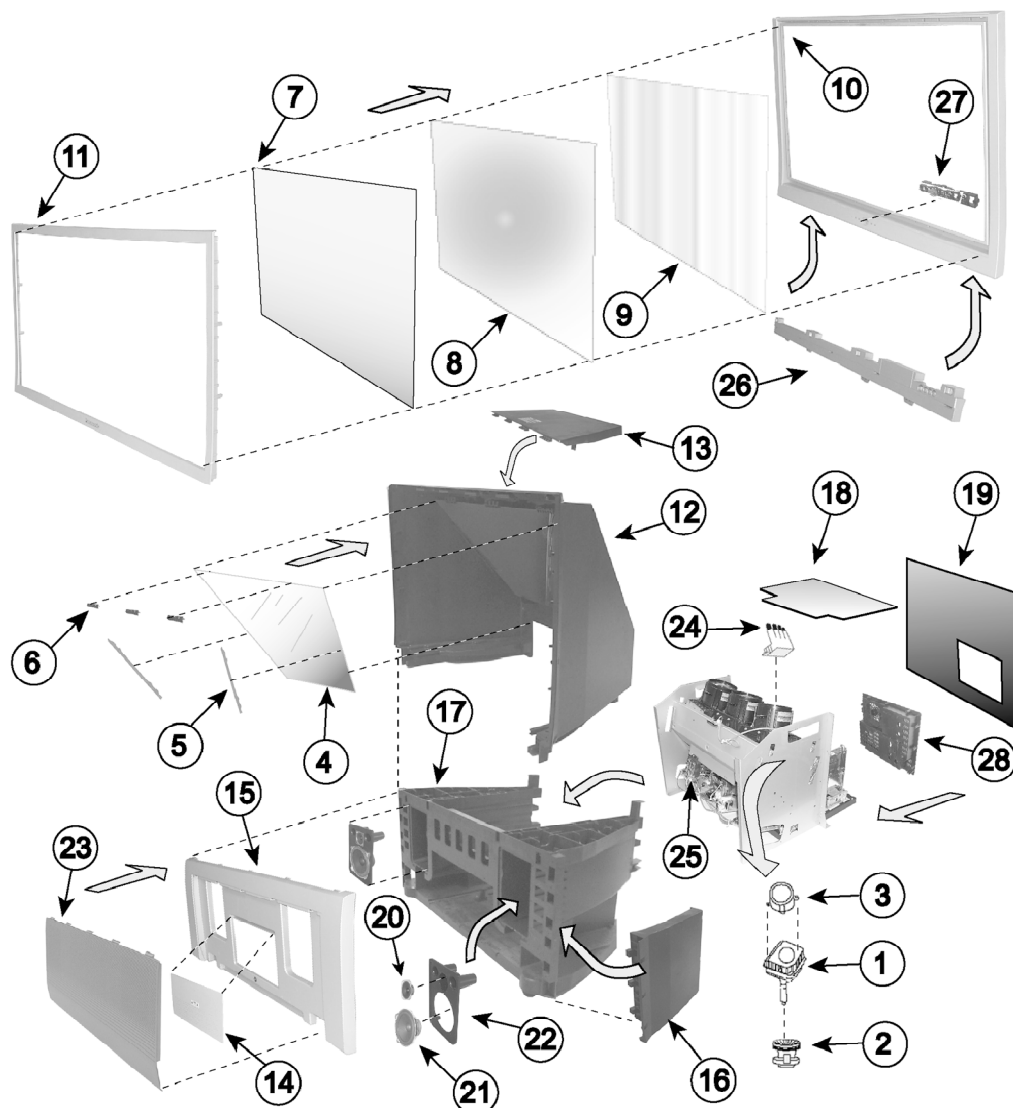
22.29. LR-Board schematic 1 of 2

22.30. LR-Board schematic 2 of 2

22.31. Voltages

22.32. Waveforms


23. Parts location



24. Parts list

24.1. Description of abbreviations guide

Important Safety Notice

Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use manufacturer's specified parts.

Abbreviation of part name and description

1. Resistor

Example :

ERD25TJ104 **C** 100K Ω , **J**, 1/4W
Type Allowance

Type	Allowance
C : Carbon	F : $\pm 1\%$
F : Fuse	G : $\pm 2\%$
M : Metal Oxide Metal Film	J : $\pm 5\%$ K : $\pm 10\%$
S : Solid	M : $\pm 20\%$
W : Wire Wound	

2. Capacitor

Example :

ECKF1H103ZF **C** 0.01 μ F, **Z**, 50V
Type Allowance

Type	Allowance
C : Carbon	C : $\pm 0.25\text{pF}$
E : Electrolytic	D : $\pm 0.5\text{pF}$
P : Polyester Polypropylene	F : $\pm 1\text{pF}$ G : $\pm 3\%$
T : Tantalum	J : $\pm 5\%$ K : $\pm 10\%$ L : $\pm 15\%$ M : $\pm 20\%$ P : $\pm 100\%$, -0% Z : $\pm 80\%$, -20%

24.2. Parts list

Ref. No.	Part No.	Part Name & Description	Remarks
CAPACITORS			
C001	ECA1HM4R7B	CAP E 4.7UF-50V	
C003	ECJ2VC1H101J	CAP C 100PF-J-50V	
C004	ECJ2VF1E224Z	CAP C .22UF-Z-25V	
C006	EEUFC1A471B	CAP E 470UF-16V	
C007	ECA1HM4R7B	CAP E 4.7UF-50V	
C009	ECJ2VC1H101J	CAP C 100PF-J-50V	
C010	ECJ2VF1E224Z	CAP C .22UF-Z-25V	
C012	EEUFC1A471B	CAP E 470UF-10V	
C051	EEUFC1E470B	CAP E 47UF-25V	
C052	TACCX103T50V	CAP C .01UF-Z-50V	
C302	ECCR1H221JC5	CAP C 220PF-J-50V	
C303	ECQM2103KZ3	CAP P .01UF-K-200V	
C304	ECQE2104KFW	CAP P .10UF-K-200V	
C305	ECA1HM470B	CAP E 47UF-50V	
C306	ECA2EM100E	CAP E 10UF-250V	
C307	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C308	ECA1HM220B	CAP E 22UF-50V	
C309	ECA2EM100B	CAP E 10UF-250V	
C312	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C313	ECKR2H102KB5	CAP C 1000PF-K-500V	
C315	ECKR1H103ZF5	CAP C .01UF-Z-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C331	ECA1HM470B	CAP E 47UF-50V	
C332	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C333	ECA1HM470B	CAP E 47UF-50V	
C334	ECA2EM470B	CAP E 47UF-250V	
C335	ECCR1H221JC5	CAP C 220PF-J-50V	
C336	ECA1HM470B	CAP E 47UF-50V	
C337	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C339	ECQE2104KFW	CAP P .10UF-K-200V	
C340	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C341	ECA2EM100B	CAP E 10UF-250V	
C345	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C346	ECKR2H102KB5	CAP C 1000PF-K-500V	
C362	ECCR1H221JC5	CAP C 220PF-J-50V	
C364	ECQE2104KFW	CAP P .10UF-K-200V	
C365	ECA2EM100B	CAP E 10UF-250V	
C366	ECA1HM470B	CAP E 47UF-50V	
C367	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C368	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C372	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C373	ECKR2H102KB5	CAP C 1000PF-K-500V	
C374	ECA1CM101B	CAP E 100UF-16V	
C405	ECA1EHG102E	CAP E 1 000UF-25V	
C406	ECA1EHG102E	CAP E 1 000UF-25V	
C407	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C408	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C411	ECJ2VB1H822K	CAP C .0082UF-K-50V	
C412	ECQB1224KF3	CAP P .22UF-K-100V	
C413	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C414	ECJ2VB1H272K	CAP C .0027UF-K-50V	
C417	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C418	ECJ2VF1H223Z	CAP C .022UF-Z-50V	
C421	ECEA1CN220UB	CAP E 22UF-16V	
C458	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C461	ECA1HHG221B	CAP E 220UF-50V	
C501	ECA1EM101B	CAP E 100UF-25V	
C502	ECQV1H105JL3	CAP P 1.0UF-J-50V	
C503	ECKR2H102KB5	CAP C 1000PF-K-500V	
C509	ECWF2474JSR	CAP P .47UF-J-200V	
C510	ECJ2VC1H221J	CAP C 220PF-J-50V	
C511	ECWH20222JVY	CAP P 2200PF-J-2KV	⚠
C512	ECWH20202JVY	CAP P 2000PF-J-2KV	⚠
C513	ECQF4103JZH	CAP P .01UF-J-400V	⚠
C514	ECWH20222JVY	CAP P 2200PF-J-2KV	⚠
C518	ECKW3D221JBP	CAP C 220PF-J-2KVDC	⚠
C519	ECKW3D221JBP	CAP C 220PF-J-2KVDC	⚠
C520	ECQB1H103JF3	CAP P .01UF-J-50V	⚠
C524	ECQB1224JF3	CAP P .22UF-J-100V	
C525	ECEA1HN220UB	CAP E 22UF-50V	
C526	ECA2EM101E	CAP E 100UF-250V	
C527	ECKR2H102KB5	CAP C 1000PF-K-500V	
C528	ECA1HM470B	CAP E 47UF-50V	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
C531	ECA160V33UE	CAP E 33UF-160V	
C533	ECKR2H101KB5	CAP C 100UF-K-500V	
C535	ECA1EM471E	CAP E 470UF-25V	
C601	EEUFC1C331B	CAP E 330UF-16V	
C602	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C653	ECA1HM010E	CAP E 1UF-50V	
C654	ECA1HM010E	CAP E 1UF-50V	
C701	ECA1CM101B	CAP E 100UF-16V	
C702	ECKW3D271KBP	CAP C 270PF-K-2KV	
C703	ECQM2104KZW	CAP P .1UF-K-200V	
C704	ECKR2H391KB5	CAP C 390PF-K-500V	
C707	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C708	ECQE1685KFB	CAP P 6.8UF-K-100V	
C801	ECQU2A474MLA	CAP. P. 47UF-M-250VAC	⚠
C802	ECQU2A474MLA	CAP. P. 47UF-M-250VAC	⚠
C803	ECKCNA222ME7	CAP C 2200PF-M-125V	⚠
C804	ECKCNA222ME7	CAP C 2200PF-M-125V	⚠
C805	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C806	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C807	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C808	ECA1EM101B	CAP E 100UF-25V	
C809	ECJ2VB1E223K	CAP C .022UF-K-25V	
C810	EETED2D102C	CAP E 1000PF-200V	⚠
C812	ECA1EHG471B	CAP E 470UF-25V	
C814	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C815	ECQB1H152JF3	CAP P 1500PF-J-50V	
C817	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C819	ECQB1H102JF3	CAP P 1000PF-J-50V	
C820	ECQV1H334JL3	CAP P .33UF-J-50V	
C821	ECQB1H272KF3	CAP P 2700PF-K-50V	
C822	ECA1HM220B	CAP E 22UF-50V	
C823	ECJ2VC1H151J	CAP C 150PF-J-50V	
C824	EEUFC1V151B	CAP E 150UF-35V	
C825	ECKCNA102MBB	CAP C .001UF-M-125V	⚠
C826	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C830	EETHC2C471B	CAP E 470PF-160V	⚠
C831	ECKW3D821KBP	CAP C 820PF-K-2KV	
C832	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C834	EEUFC1V222E	CAP E 2200UF-35V	
C836	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C837	ECA1EM472E	CAP E 4700UF-25V	
C839	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C841	ECA1EM472E	CAP E 4700UF-25V	
C842	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C843	ECA1VM222E	CAP E 2200UF-35V	
C844	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C845	ECA1VM222E	CAP E 2200UF-35V	
C846	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C848	ECA1CM101B	CAP E 100UF-16V	
C849	ECKR1H223ZF5	CAP C .022UF-Z-50V	
C851	ECQV1H104JL3	CAP P .10UF-J-50V	






Ref. No.	Part No.	Part Name & Description	Remarks
C852	ECA1EM101B	CAP E 100UF-25V	
C853	ECJ2YF1E474Z	CAP C .47UF-Z-25V	
C854	ECA1CM101B	CAP E 100UF-16V	
C855	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C856	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C860	ECJ2VB1H103K	CAP C .01UF-K-50V	
C861	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C862	ECJ2VB1H103K	CAP C .01UF-K-50V	
C863	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C864	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C865	ECA1CM221B	CAP E 10UF-16V	
C866	ECA0JM221B	CAP E 220UF-6.3V	
C867	ECA1CM221B	CAP E 10UF-16V	
C868	EEUFC1C471B	CAP E 470UF-16V	
C869	EEUFC1A471B	CAP E 470UF-10V	
C870	EEUFC1A471B	CAP E 470UF-10V	
C874	ECA1VM221B	CAP E 220UF-35V	
C875	ECA1VM221B	CAP E 220UF-35V	
C876	ECA1VM221B	CAP E 220UF-35V	
C877	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C878	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C879	ECA0JM221B	CAP E 220UF-6.3V	
C880	ECA0JM221B	CAP E 220UF-6.3V	
C885	EEUFC1A471B	CAP E 470UF-10V	
C886	EEUFC1A471B	CAP E 470UF-10V	
C889	ECA1VM221B	CAP E 220UF-35V	
C890	ECA1VM221B	CAP E 220UF-35V	
C902	ECQM2103KZ3	CAP P .01UF-K-200V	
C903	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C904	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C906	ECQM2103KZ3	CAP P .01UF-K-200V	
C907	ECA2CM100E	CAP E 10UF-160V	
C908	ECA1CM101B	CAP E 100UF-16V	
C909	ECA1CM101B	CAP E 100UF-16V	
C910	ECA2CM100E	CAP E 10UF-160V	
C911	ECQE2104KFW	CAP P .10UF-K-200V	
C912	ECA1HM220B	CAP E 22UF-50V	
C913	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C916	ECQE2104KFW	CAP P .10UF-K-200V	
C939	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C940	ECQM2103KZ3	CAP P .01UF-K-200V	
C941	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C942	ECQM2103KZ3	CAP P .01UF-K-200V	
C943	ECA2CM100E	CAP E 10UF-160V	
C944	ECA1CM101B	CAP E 100UF-16V	
C945	ECA1CM101B	CAP E 100UF-16V	
C947	ECA2CM100E	CAP E 10UF-160V	
C948	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C949	ECQE2104KFW	CAP P .10UF-K-200V	
C962	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C963	ECQM2103KZ3	CAP P .01UF-K-200V	
C964	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C965	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C966	ECQM2103KZ3	CAP P .01UF-K-200V	

Ref. No.	Part No.	Part Name & Description	Remarks
C967	ECA2CM100E	CAP E 10UF-160V	
C968	ECA1CM101B	CAP E 100UF-16V	
C969	ECA1CM101B	CAP E 100UF-16V	
C970	ECA2CM100E	CAP E 10UF-160V	
C971	ECQE2104KFW	CAP P .10UF-K-200V	
C972	ECA1HM220B	CAP E 22UF-50V	
C1303	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1304	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C1305	ECJ2VB1C104K	CAP C .1UF-K-16V	
C1306	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1307	ECA1CM101B	CAP E 100UF-16V	
C1502	ECQE6104KFB	CAP P 100UF-K-100V	
C1503	ECQE6104KFB	CAP P 100UF-K-100V	
C1504	ECJ2FB1H104K	CAP C .1UF-K-50V	
C1505	ECA1CM101B	CAP E 100UF-16V	
C1506	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1508	ECA1CM101B	CAP E 100UF-16V	
C1509	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C1510	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C1511	ECJ2VC1H471J	CAP C 470PF-J-50V	
C1513	ECEA1EN101UB	CAP E 100UF-25V	
C1514	ECA1CM101B	CAP E 100UF-16V	
C2201	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2202	ECA1HM100B	CAP E 10UF-50V	
C2203	ECA1HMR47B	CAP E .47UF-50V	
C2204	ECQB1H473JF3	CAP P .047UF-J-50V	
C2205	ECSF1CE335VB	CAP E 33MF-16V	
C2206	ECQB1H223JF3	CAP P .022UF-J-50V	
C2207	ECA1HM010B	CAP E 1UF-50V	
C2208	ECSF1CE106VB	CAP E 10UF-16V	
C2209	ECA1HM4R7B	CAP E 4.7UF-50V	
C2210	ECA1HM2R2B	CAP E 2.2UF-50V	
C2211	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2212	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2214	ECA1CM101B	CAP E 100UF-16V	
C2215	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2216	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2303	ECA50YT1R5KB	CAP E 1.5UF-50V	
C2306	ECA50YT1R5KB	CAP E 2.2UF-50V	
C2310	ECQB1H224JF3	CAP P .22UF-J-50V	
C2314	F1J1C225A083	CAP C 2.2UF-Z-16V	
C2317	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2319	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2322	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2323	ECQB1H224JF3	CAP P .22UF-J-50V	
C2327	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2329	ECJ2VC1H270J	CAP C 27PF-J-50V	
C2331	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2334	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2335	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2337	ECJ2VB1H331K	CAP C 330PF-K-50V	
C2338	ECJ2VB1H682K	CAP C .0068UF-K-50V	
C2340	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2342	ECJ2VB1H331K	CAP C 330PF-K-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C2344	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2346	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2348	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2349	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2352	ECJ2VB1H682K	CAP C .0068UF-K-50V	
C2353	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2356	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2359	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2361	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2363	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2365	EEUFC1E222E	CAP E 2200UF-25V	
C2368	EEUFC1E222E	CAP E 2200UF-25V	
C2369	ECEA1CN100UB	CAP E 10UF-16V	
C2370	ECEA1CN100UB	CAP E 10UF-16V	
C2371	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2372	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2373	ECA1HM100B	CAP E 10UF-50V	
C2374	ECA1EM101B	CAP E 100UF-25V	
C2375	ECA1HM100B	CAP E 10UF-50V	
C2376	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2377	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2378	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2379	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2381	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2382	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2394	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2398	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2403	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2404	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2421	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2426	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2434	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2451	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2452	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2453	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2454	ECJ2VB1H222K	CAP C .0022UF-K-50V	
C2455	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2456	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2457	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2458	ECA1HM4R7B	CAP E 4.7UF-50V	
C2459	ECA1HM4R7B	CAP E 4.7UF-50V	
C2460	ECJ2VB1H103K	CAP C .01UF-K-50V	
C2461	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2462	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2463	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2464	ECJ2VB1H222K	CAP C .0022UF-K-50V	
C2465	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2466	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2467	ECA1HM4R7B	CAP E 4.7UF-50V	
C2468	ECA1HM4R7B	CAP E 4.7UF-50V	
C2469	ECA1HM4R7B	CAP E 4.7UF-50V	
C2470	ECA1CM101B	CAP E 100UF-16V	
C3201	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3202	ECJ2VB1H152K	CAP C .0015UF-K-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C3203	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3331	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3332	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3333	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3334	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3335	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3336	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3337	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3338	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3339	ECJ2VB1H103K	CAP C .01UF-K-50V	
C3340	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3341	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3342	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3343	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3344	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3345	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3346	ECJ2VB1H103K	CAP C .01UF-K-50V	
C3347	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3348	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3349	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3350	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3351	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3352	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3353	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3354	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3355	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3357	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3358	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3359	ECA1EM471E	CAP E 470UF-25V	
C3360	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3361	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C3362	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3363	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3364	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3365	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3366	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3367	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3368	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C3369	ECJ2YB1A105K	CAP C 1.0UF-K-125V	
C7001	ECJ3YF1E225Z	CAP C 22MF-Z-25V	
C7002	ECJ3YF1E225Z	CAP C 22MF-Z-25V	
C7004	ECA1EHG221B	CAP E 220UF-25V	
C7006	ECA1EHG221B	CAP E 220UF-25V	
C7015	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7016	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7017	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7018	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C7032	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7033	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7034	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7035	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7050	ECA1VM470B	CAP E 47UF-35V	
C7060	ECA1CHG101B	CAP E 100UF-16V	
C7061	ECA1CHG101B	CAP E 100UF-16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C7065	ECA1VM470B	CAP E 47UF-35V	
DIODES			
D001	MAZ31500ML	DIODE ZENER	
D002	MAZ31500ML	DIODE ZENER	
D003	MAZ31500ML	DIODE ZENER	
D004	MAZ31500ML	DIODE ZENER	
D081	LN21RCPHL	DIODE	
D082	MAZ40560MF	DIODE ZENER	
D083	MAZ40560MF	DIODE ZENER	
D301	MA2C16700E	DIODE	
D302	MAZ40680LF	DIODE ZENER	
D303	TVSRM1V1	DIODE	
D304	B0HALP000002	DIODE FAST RECOVERY	
D306	MA2C165001VT	DIODE	
D307	MA2C165001VT	DIODE	
D312	MA2C18800E	DIODE	
D313	MA2C18800E	DIODE	
D314	MA2C18800E	DIODE	
D315	MA2C18800E	DIODE	
D331	B0HALP000002	DIODE FAST RECOVERY	
D331	MA2C165001VT	DIODE	
D334	MA2C165001VT	DIODE	
D335	MA2C165001VT	DIODE	
D339	MA2C18800E	DIODE	
D340	MA2C18800E	DIODE	
D341	MA2C18800E	DIODE	
D342	MA2C18800E	DIODE	
D361	B0HALP000002	DIODE FAST RECOVERY	
D361	B0HALP000002	DIODE	
D363	MA2C165001VT	DIODE	
D364	MA2C165001VT	DIODE	
D369	MA2C18800E	DIODE	
D370	MA2C18800E	DIODE	
D371	MA2C18800E	DIODE	
D372	MA2C18800E	DIODE	
D407	MA3X152K0L	DIODE	
D409	MA3X152K0L	DIODE	
D410	MA3X152K0L	DIODE	
D411	MA3X152K0L	DIODE	
D451	B0EAKC000003	DIODE RECTIFIER	
D452	B0EAKC000003	DIODE RECTIFIER	
D453	B0EAKC000003	DIODE RECTIFIER	
D454	B0EAKC000003	DIODE RECTIFIER	
D455	B0EAKC000003	DIODE RECTIFIER	
D456	B0EAKC000003	DIODE RECTIFIER	
D458	B0EAKL000008	DIODE RECTIFIER	
D465	MAZ40390MF	DIODE ZENER	
D466	MA3X152K0L	DIODE	
D501	B0HALP000002	DIODE FAST RECOVERY	
D502	MAZ31500ML	DIODE ZENER	
D503	B0HBRV000001	DIODE	
D504	MAZ42700MF	DIODE ZENER	
D509	MA3X152K0L	DIODE	
D510	MAZ30820LL	DIODE ZENER	



Ref. No.	Part No.	Part Name & Description	Remarks
D511	B0HAHP000014	DIODE	
D512	B0HALP000002	DIODE FAST RECOVERY	
D513	MA2C165001VT	DIODE	
D0514	MAZ30300LL	DIODE ZENER	
D515	B0HALP000002	DIODE FAST RECOVERY	
D516	EU2YXV0	DIODE	
D519	AU02ZV0	DIODE	
D520	MA3X152K0L	DIODE	
D634	MA2C165001VT	DIODE	
D650	MAZ41100MF	DIODE ZENER	
D651	MAZ41100MF	DIODE ZENER	
D656	MAZ41100MF	DIODE ZENER	
D657	MAZ41100MF	DIODE ZENER	
D659	MAZ41100MF	DIODE ZENER	
D660	MAZ41100MF	DIODE ZENER	
D662	MAZ41100MF	DIODE ZENER	
D663	MAZ41100MF	DIODE ZENER	
D702	B0HALP000002	DIODE FAST RECOVERY	
D801	D3SB80-4101	DIODE	
D802	D4EAB3610002	DIODE	
D804	B0EBKM000016	DIODE	
D815	MA2C165001VT	DIODE	
D816	MA2C70000F	DIODE	
D817	AU01ZV0	DIODE	
D818	MAZ32700LL	DIODE ZENER	
D819	B0BA01000046	DIODE ZENER	
D822	B0AAGM000006	DIODE SWITCHING	
D825	SF5L60U-4115	GERMANIUM DIODE	
D827	SF5LC30-4115	GERMANIUM DIODE	
D828	SF5LC30-4115	GERMANIUM DIODE	
D829	SF5LC30-4115	GERMANIUM DIODE	
D830	B0HAPM000012	DIODE	
D831	B0HAPM000012	DIODE	
D835	B0JAME000052	DIODE	
D837	MA3X152K0L	DIODE	
D870	MA2C165001VT	DIODE	
D872	MA2062-BTP	DIODE	
D873	MAZ31500ML	DIODE ZENER	
D874	MA2120-ATP	DIODE	
D875	MA2062-BTP	DIODE	
D880	B0JCME000025	DIODE	
D881	B0JCME000025	DIODE	
D882	B0JCME000025	DIODE	
D884	MA2062-BTP	DIODE	
D885	MA2062-BTP	DIODE	
D886	MA2C165001VT	DIODE	
D887	B0JCME000025	DIODE	
D888	B0JCME000025	DIODE	
D891	MAZ30330LL	DIODE ZENER	
D902	MA2C18800E	DIODE	
D933	MA2C18800E	DIODE	
D953	B0ZAZ0000047	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D962	MA2C18800E	DIODE	
D973	B0ZAZ0000047	DIODE	
D983	B0ZAZ0000047	DIODE	
D1502	B0HACW000001	DIODE	
D1503	MAZ30300LL	DIODE ZENER	⚠
D1504	B0HACW000001	DIODE	
D1505	MA2C0290BF	DIODE	
D1506	MAZ30510ML	DIODE	⚠
D1507	MAZ30300LL	DIODE ZENER	
D1510	MAZ30300LL	DIODE ZENER	
D1599	MA3X152K0L	DIODE	
D2302	MA3X152K0L	DIODE	
D2306	MA3X152K0L	DIODE	
D2307	MA3X152K0L	DIODE	
D2330	MA3X152K0L	DIODE	
D2331	MA3X152K0L	DIODE	
D2334	MA2C165001VT	DIODE	
D3301	MAZ31100ML	DIODE ZENER	
D3302	MAZ31100ML	DIODE ZENER	
D3304	MAZ31100ML	DIODE ZENER	
D3306	MAZ31100ML	DIODE ZENER	
D3307	MAZ31100ML	DIODE ZENER	
D3308	MAZ31100ML	DIODE ZENER	
D3309	MAZ31100ML	DIODE ZENER	
D3310	MAZ31100ML	DIODE ZENER	
D3312	MAZ31100ML	DIODE ZENER	
D3314	MAZ31100ML	DIODE ZENER	
D3316	MAZ31100ML	DIODE ZENER	
D3317	MAZ31100ML	DIODE ZENER	
D3318	MAZ31100ML	DIODE ZENER	
D3319	MAZ31100ML	DIODE ZENER	
D3320	MAZ31100ML	DIODE ZENER	
D3321	MAZ31100ML	DIODE ZENER	
D3322	MAZ31100ML	DIODE ZENER	
D3323	MAZ31100ML	DIODE ZENER	
D3324	MAZ31100ML	DIODE ZENER	
D3325	MAZ31100ML	DIODE ZENER	
D3326	MAZ31100ML	DIODE ZENER	
D3328	MAZ31100ML	DIODE ZENER	
D3329	MAZ31100ML	DIODE ZENER	
D3330	MAZ31100ML	DIODE ZENER	
D3332	CVS20A120MTA	DIODE	
D3334	CVS20A120MTA	DIODE	
D3335	MAZ31100ML	DIODE ZENER	
D3336	MAZ31100ML	DIODE ZENER	
D3339	MAZ31100ML	DIODE ZENER	
D3340	MAZ31100ML	DIODE ZENER	
D7060	MA3X152K0L	DIODE	
FUSES			
F801	K5D632AD0002	FUSE 6.3A/125V	⚠
INTEGRATED CIRCUITS			
IC451	C1AA00000521	VERTICAL OUTPUT	
IC701	C0BBBA000043	EW, HHS ADJ. OP-AMP	

Ref. No.	Part No.	Part Name & Description	Remarks
IC801	AN8029	POWER SUPPLY	⚠
IC802	C0EAS0000025	MAIN REGULATOR	⚠
IC805	AN78M12LB	12V REGULATOR	
IC811	0N3171RLF	OPTO COUPLER	⚠
IC872	C0DACMG00001	9V REGULATOR	
IC874	SI-8050J	5V REGULATOR	
IC875	C0DACMG00001	3.3V REGULATOR	
IC876	C0DACMG00001	2.5V REGULATOR	
IC877	C0DACMG00001	1.8V REGULATOR	
IC880	AN78M12LB	12V REGULATOR	
IC1302	TVR2AJ180S	MAIN EEPROM	
IC1303	TVR2AJ199S	CONVERGENCE EEPROM	
IC1501	C0ABBA000073	EHT ADJ. OP-AMP	
IC2201	AN5849S-E1V	MTS AUDIO	
IC2301	C1AA00000645	AUDIO AMPLIFIER	
IC2303	C0ABBA000073	VAO OP-AMP	
IC2401	NJW1164MPTE1	BBE VIVA PROCESSOR	
IC7001	C5AA00000196	CONVERGENCE AMPLIFIER	
IC7002	C5AA00000196	CONVERGENCE AMPLIFIER	
COILS			
L001	ELELN330JA	COIL 33UH	
L002	ELELN330JA	COIL 33UH	
L301	ELEBD101KA	COIL 100UH	
L302	ELESN100JA	COIL PEAKING 10UH	
L303	ELESN6R8JA	COIL PEAKING 6.8UH	
L304	ELESN4R7JA	RADIAL INDUCTOR	
L307	ELEBD101KA	COIL 100UH	
L331	ELESN100JA	COIL PEAKING 10UH	
L332	ELESN6R8JA	COIL PEAKING 6.8UH	
L333	G0C560KA0021	COIL PEAKING 56UH	
L334	ELESN4R7KA	COIL PEAKING 4.7UH	
L335	ELEBD101KA	COIL 100UH	
L337	G0C560KA0021	COIL PEAKING 56UH	
L341	ELEBD101KA	COIL 100UH	
L361	ELEBD101KA	COIL 100UH	
L362	ELESN100JA	COIL PEAKING 10UH	
L363	ELESN150JA	COIL PEAKING 15UH	
L364	ELESN4R7JA	RADIAL INDUCTOR	
L366	ELEBD101KA	COIL 100UH	
L500	TALL08TR82MA	COIL	
L501	EXCELSA35T	FERRITE BEAD	
L510	EXCELD25V	FERRITE BEAD	
L511	EXCELD25V	FERRITE BEAD	
L515	EXCELD25V	FERRITE BEAD	
L516	EXCELD25V	FERRITE BEAD	
L555	ELH5L718	COIL	
L701	ELESN100KA	COIL PEAKING 10UH	
L702	EXCELSA35T	FERRITE BEAD	
L703	ELC18B152L	FILTER	
L704	ELC18B151G	FILTER	
L805	EXCELD25V	FERRITE BEAD	
L806	EXCELD25V	FERRITE BEAD	
L808	EXCELD35V	FERRITE BEAD	



Ref. No.	Part No.	Part Name & Description	Remarks
L810	EXCELD25V	FERRITE BEAD	
L811	EXCELD25V	FERRITE BEAD	
L815	EXCELSA39E	EMI BEAD CORE	
L816	EXCELSA39E	EMI BEAD CORE	
L817	TALL08T680KA	COIL	
L818	TALL08T680KA	COIL	
L819	EXCELD25V	FERRITE BEAD	
L820	EXCELD25V	FERRITE BEAD	
L821	EXCELD25V	FERRITE BEAD	
L825	TALL08T330KA	COIL	
L826	TALL08T330KA	COIL	
L827	TALL08T330KA	COIL	
L880	TALL08T220KA	COIL	
L881	TALL08T221KA	COIL	
L882	TALL08T220KA	COIL	
L883	G0ZZ00001909	INT CKT	
L884	TALFP15B151K	LINE FILTER	
L885	G0ZZ00001909	INT CKT	
L886	G0A101E00003	COIL	
L887	G0A101E00003	COIL	
L888	G0A470F00004	COIL	
L889	TALL08T221KA	COIL	
L890	TALL08T221KA	COIL	
L892	G0ZZ00001909	INT CKT	
L893	G0ZZ00001909	INT CKT	
L894	G0A101E00003	COIL	
L895	G0A101E00003	COIL	
L901	EXCELSA35T	FERRITE BEAD	
L902	EXCELSA35T	FERRITE BEAD	
L903	EXCELSA35T	FERRITE BEAD	
L933	EXCELSA35T	FERRITE BEAD	
L934	EXCELSA35T	FERRITE BEAD	
L935	EXCELSA35T	FERRITE BEAD	
L961	EXCELSA35T	FERRITE BEAD	
L962	EXCELSA35T	FERRITE BEAD	
L963	EXCELSA35T	FERRITE BEAD	
L1301	EXCELSA35T	FERRITE BEAD	
L1302	EXCELSA39V	EMI BEAD CORE	
L1303	EXCELSA39V	EMI BEAD CORE	
L1304	EXCELSA39V	EMI BEAD CORE	
L1305	EXCELSA39V	EMI BEAD CORE	
L1306	EXCELSA39V	EMI BEAD CORE	
L2201	ELESN100JA	COIL PEAKING 10UH	
L2310	EXCELD25V	FERRITE BEAD	
L2311	ELC12E390L	CHOKE COIL 39UH	
L2314	EXCELD25V	FERRITE BEAD	
L2315	ELC12E390L	CHOKE COIL 39UH	
L2317	TALL08T330KA	COIL	
L2318	TALL08T330KA	COIL	
L2354	EXCELSA35T	FERRITE BEAD	
L2355	EXCELSA35T	FERRITE BEAD	
L7001	EXCELSA39V	EMI BEAD CORE	
L7002	EXCELSA39V	EMI BEAD CORE	
L7003	EXCELSA39V	EMI BEAD CORE	

Ref. No.	Part No.	Part Name & Description	Remarks
L7004	EXCELSA39V	EMI BEAD CORE	
L7005	EXCELSA39V	EMI BEAD CORE	
L7006	EXCELSA39V	EMI BEAD CORE	
LF801	ELF21N035A	LINE FILTER	⚠
LF803	ELF21N035A	LINE FILTER	⚠
TRANSISTORS			
Q301	2SC1473ATA	TRANSISTOR	
Q302	2SC3526H	TRANSISTOR	
Q303	2SC1473ATA	TRANSISTOR	
Q304	2SA1309ATA	TRANSISTOR	
Q325	2SC3311ATA	TRANSISTOR	
Q331	2SC3526H	TRANSISTOR	
Q332	2SA1309ATA	TRANSISTOR	
Q353	2SC3942LB	TRANSISTOR	
Q354	B1BAAN000025	TRANSISTOR	
Q355	B1BCAN000004	TRANSISTOR	
Q362	2SC3311ATA	TRANSISTOR	
Q363	2SC3526H	TRANSISTOR	
Q364	2SA1309ATA	TRANSISTOR	
Q365	2SC3311ATA	TRANSISTOR	
Q366	2SC3311ATA	TRANSISTOR	
Q367	2SA1309ATA	TRANSISTOR	
Q368	2SA1309ATA	TRANSISTOR	
Q373	2SC3942LB	TRANSISTOR	
Q374	B1BAAN000025	TRANSISTOR	
Q375	B1BCAN000004	TRANSISTOR	
Q376	2SC3311ATA	TRANSISTOR	
Q393	2SC3942LB	TRANSISTOR	
Q394	B1BAAN000025	TRANSISTOR	
Q395	B1BCAN000004	TRANSISTOR	
Q397	2SC3311ATA	TRANSISTOR	
Q406	2PD601AR-115	TRANSISTOR	
Q501	B1CEML000001	TRANSISTOR	
Q509	2SC1473QRTA	TRANSISTOR	
Q510	2SC1473QRTA	TRANSISTOR	
Q512	2PD601AR-115	TRANSISTOR	
Q513	2PD601AR-115	TRANSISTOR	
Q551	B1BAJW000001	TRANSISTOR	
Q606	2PD601AR-115	TRANSISTOR	
Q701	2SK2538000LB	TRANSISTOR	
Q801	2SK2917LB	TRANSISTOR	
Q802	2PD601AR-115	TRANSISTOR	
Q803	2PB709AR-115	TRANSISTOR	
Q854	2SA19610QAHW	TRANSISTOR	
Q881	UN2214TX	TRANSISTOR	
Q882	UN2115TX	TRANSISTOR	
Q883	UN2215TX	TRANSISTOR	
Q901	2SB1321ARA	TRANSISTOR	
Q903	2SA1309ATA	TRANSISTOR	
Q904	2SD1992ARA	TRANSISTOR	
Q905	2SC3311ATA	TRANSISTOR	
Q906	2SC3311ATA	TRANSISTOR	
Q907	2SA1309ATA	TRANSISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
Q908	2SC3311ATA	TRANSISTOR	
Q934	2SA1309ATA	TRANSISTOR	
Q935	2SC3311ATA	TRANSISTOR	
Q936	2SC3311ATA	TRANSISTOR	
Q937	2SA1309ATA	TRANSISTOR	
Q938	2SB1321ARA	TRANSISTOR	
Q941	2SD1992ARA	TRANSISTOR	
Q951	2SC3311ATA	TRANSISTOR	
Q952	2SC3311ATA	TRANSISTOR	
Q953	2SC3311ATA	TRANSISTOR	
Q955	2SA1248SRA	TRANSISTOR	
Q956	2SC3116SRA	TRANSISTOR	
Q957	2SA1248SRA	TRANSISTOR	
Q958	2SC3116SRA	TRANSISTOR	
Q959	2SA1248SRA	TRANSISTOR	
Q960	2SC3116SRA	TRANSISTOR	
Q961	2SB1321ARA	TRANSISTOR	
Q962	2SC3311ATA	TRANSISTOR	
Q964	2SD1992ARA	TRANSISTOR	
Q965	2SA1309ATA	TRANSISTOR	
Q966	2SC3311ATA	TRANSISTOR	
Q967	2SC3311ATA	TRANSISTOR	
Q968	2SA1309ATA	TRANSISTOR	
Q1503	2SA1309ATA	TRANSISTOR	
Q1504	B1BAAV000003	TRANSISTOR	
Q1505	2SC3311ATA	TRANSISTOR	
Q2301	UN2215TX	TRANSISTOR	
Q2302	2PB709AR-115	TRANSISTOR	
Q2303	2PD601AR-115	TRANSISTOR	
Q2304	2PB709AR-115	TRANSISTOR	
Q2305	UN2115TX	TRANSISTOR	
Q2306	UNR221600L	TRANSISTOR	
Q2307	UNR221600L	TRANSISTOR	
Q2308	2PD601AR-115	TRANSISTOR	
Q2309	2PD601AR-115	TRANSISTOR	
Q2350	UNR221600L	TRANSISTOR	
Q2352	2PB709AR-115	TRANSISTOR	
Q2358	UNR221600L	TRANSISTOR	
Q2451	2PD601AR-115	TRANSISTOR	
Q2452	2PD601AR-115	TRANSISTOR	
Q7006	2PD601AR-115	TRANSISTOR	
Q7007	2PD601AR-115	TRANSISTOR	
Q7060	2PB709AR-115	TRANSISTOR	
Q7061	2PD601AR-115	TRANSISTOR	
RELAYS			
RL801	K6B1ADA00010	RELAY	
RL802	K6B1ADA00010	RELAY	
RESISTORS			
R001	ERJ6GEYJ101V	RES M 100-J-1/10W	
R002	ERJ6GEYJ101V	RES M 100-J-1/10W	
R004	ERJ6GEYJ101V	RES M 100-J-1/10W	
R005	ERJ6GEYJ101V	RES M 100-J-1/10W	
R008	ERJ6GEYJ103V	RES M 10K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R009	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R010	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R013	ERG1SJ273P	RES M 27K-J-1W	
R015	ERG1SJ273P	RES M 27K-J-1W	
R072	ERDS2TJ101T	RES C 100-J-1/4W	
R073	ERDS2TJ471T	RES C 470-J-1/4W	
R080	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R081	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R082	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R083	ERDS2TJ512T	RES C 5.1K-J-1/4W	
R084	ERDS2TJ912T	RES C 9.1K-J-1/4W	
R086	ERDS2TJ681T	RES C 680-J-1/4W	
R087	ERDS2TJ331T	RES C 330-J-1/4W	
R088	ERDS2TJ392T	RES C 3.9K-J-1/4W	
R089	ERDS2TJ822T	RES C 8.2K-J-1/4W	
R301	ERDS1FJ394P	RES C 390K-J-1/2W	
R302	ERDS2TJ101T	RES C 100-J-1/4W	
R303	EROS2THF2200	RES M 220-F-1/4W	
R304	ERDS2TJ334T	RES C 330K-J-1/4W	
R305	EROS2THF2200	RES M 220-F-1/4W	
R306	EROS2THF1001	RES M 1K-F-1/4W	
R307	ERDS2TJ220T	RES C 22-J-1/4W	
R308	ERDS2TJ334T	RES C 330K-J-1/4W	
R310	ERDS2TJ562T	RES C 5.6K-J-1/4W	
R311	ERDS2TJ470T	RES C 47-J-1/4W	
R312	ERG7ZJ272	RES M 2.7K-J-7W	
R313	ERDS2TJ151T	RES C 150-J-1/4W	
R315	ERDS2TJ563T	RES C 56K-J-1/4W	
R316	ERDS2TJ821T	RES C 820-J-1/4W	
R317	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R318	ERDS2TJ681T	RES C 680-J-1/4W	
R319	ERG12SJ101P	RES M 100-J-1W	
R320	ERDS1FJ330P	RES C 33-J-1/2W	
R321	ERDS1FJ330P	RES C 33-J-1/2W	
R322	ERG12SJ101P	RES M 100-J-1W	
R323	ERDS2TJ470T	RES C 47-J-1/4W	
R325	ERDS2TJ473T	RES C 47K-J-1/4W	
R325	ERDS2TJ473T	RES C 47K-J-1/4W	
R326	ERDS2TJ101T	RES C 100-J-1/4W	
R327	ERC12GK331D	RES C 330-K-1/2W	
R328	ERDS1TJ104T	RES C 100K-J-1/2W	
R329	ERDS1FJ103T	RES C 10K-J-1/2W	
R331	EROS2THF2200	RES M 220-F-1/4W	
R332	ERDS2TJ101T	RES C 100-J-1/4W	
R333	EROS2THF2200	RES M 220-F-1/4W	
R334	ERDS2TJ220T	RES C 22-J-1/4W	
R335	EROS2THF4700	RES M 470-F-1/4W	
R337	ERDS2TJ151T	RES C 150-J-1/4W	
R338	ERDS2TJ681T	RES C 680-J-1/4W	
R341	ERDS2TJ101T	RES C 100-J-1/4W	
R344	ERG7ZJ272	RES M 2.7K-J-7W	
R345	ERDS2TJ470T	RES C 47-J-1/4W	
R346	ERDS2TJ470T	RES C 47-J-1/4W	
R348	ERDS2TJ563T	RES C 56K-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R349	ERDS2TJ821T	RES C 820-J-1/4W	
R350	ERG12SJ101P	RES M 100-J-1W	
R351	ERDS1FJ330P	RES C 33-J-1/2W	
R352	ERDS1FJ330P	RES C 33-J-1/2W	
R353	ERG12SJ101P	RES M 100-J-1W	
R354	ERDS2TJ473T	RES C 47K-J-1/4W	
R355	ERDS1FJ103T	RES C 10K-J-1/2W	
R356	ERC12GK331D	RES C 330-K-1/2W	
R357	ERDS1TJ104T	RES C 100K-J-1/2W	
R360	ERDS2TJ470T	RES C 47-J-1/4W	
R363	ERDS2TJ220T	RES C 22-J-1/4W	
R365	ERDS2TJ221T	RES C 220-J-1/4W	
R366	ERDS2TJ101T	RES C 100-J-1/4W	
R367	EROS2THF2200	RES M 220-F-1/4W	
R368	EROS2THF2200	RES M 220-F-1/4W	
R369	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R370	EROS2THF1470	RES M 1.47K-F-1/4W	
R371	EROS2THF1001	RES M 1K-F-1/4W	
R372	EROS2THF82R0	RES M 82.0-F-1/4W	
R374	ERDS2TJ151T	RES C 150-J-1/4W	
R375	ERDS2TJ470T	RES C 47-J-1/4W	
R378	ERDS2TJ101T	RES C 100-J-1/4W	
R379	ERDS2TJ563T	RES C 56K-J-1/4W	
R380	ERDS2TJ821T	RES C 820-J-1/4W	
R382	ERDS1FJ103T	RES C 10K-J-1/2W	
R383	ERG12SJ101P	RES M 100-J-1W	
R384	ERDS1FJ330P	RES C 33-J-1/2W	
R385	ERDS1FJ330P	RES C 33-J-1/2W	
R386	ERG12SJ101P	RES M 100-J-1W	
R387	ERG7ZJ272	RES M 2.7K-J-7W	
R389	ERDS2TJ473T	RES C 47K-J-1/4W	
R390	ERC12GK331D	RES C 330-K-1/2W	
R391	ERDS1TJ104T	RES C 100K-J-1/2W	
R392	EROS2THF8201	RES M 8.2K-F-1/4W	
R393	EROS2THF5101	RES M 8.2K-F-1/4W	
R394	EROS2THF9760	RES M 976-F-1/4W	
R395	ERDS2TJ221T	RES C 220-J-1/4W	
R396	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R397	EROS2THF1201	RES M 1.2K-F-1/4W	
R398	EROS2THF3300	RES M 330-F-1/4W	
R408	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R409	ERDS2TJ563T	RES C 56K-J-1/4W	
R410	ERJ6GEYJ224V	RES M 220K-J-1/10W	
R411	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R412	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R415	ERG3FJ331H	RES M 330-J-3W	
R421	ERJ6ENF2702V	RES M 27K-F-1/10W	
R422	ERJ6ENF82R0V	RES M 82-F-1/10W	
R423	ERJ6ENF5601V	RES M 5.6K-F-1/10W	
R425	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R426	ERJ6ENF1502V	RES M 15K-F-1/10W	
R428	ERJ6ENF1502V	RES M 15K-F-1/10W	
R434	ERX12SJ1R8V	RES M 1.8-J-1/2W	
R435	ERX12SJ1R8V	RES M 1.8-J-1/2W	

Ref. No.	Part No.	Part Name & Description	Remarks
R464	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R465	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R465	ERJ6GEYJ472V	ES M 4.7K-J-1/10W	
R466	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R470	ERDS2TJ331T	RES C 330-J-1/4W	
R471	ERDS2TJ331T	RES C 330-J-1/4W	
R472	ERDS2TJ331T	RES C 330-J-1/4W	
R501	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R502	ERJ6GEYJ680V	RES M 68-J-1/10W	
R503	ERG2FJ180H	RES M 18-J-2W	
R504	ERG3FJ271H	RES M 270-J-3W	
R505	ERG1SJ120P	RES M 12-J-1W	
R506	ERX1SJR47P	RES M .47-J-1W	
R512	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R513	ERDS2TJ471T	RES C 470-J-1/4W	
R514	EROS2THF5602	RES M 56K-F-1/4W	
R515	EROS2THF4642	RES M 45.4K 1/4W	
R516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R517	EROS2THF2002	RES M 20K-F-1/4W	
R518	ERX12SJR22V	RES M .22-J-1/2W	
R519	ERQ12HKR22P	RES F .22-K-1/2W	
R520	ERQ12HJ330P	RES F 33-J-1/2W	
R521	EROS2THF2612	RES M 260-1/4W	
R522	EROS2THF7151	RES M 7.15K-F-1/4W	
R523	ERDS2TJ275T	RES C 2.7MEG-J-1/4W	
R524	EROS2THF2002	RES M 20K-F-1/4W	
R525	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R534	EROS2THF1203	RES M 120K-F-1/4W	
R535	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R541	ERDS2TJ563T	RES C 56K-J-1/4W	
R550	EROS2THF1002	RES M 10K-F-1/4W	
R560	ERJ6GEYJ101V	RES M 100-J-1/10W	
R561	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R562	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R621	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R622	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R624	ERJ6GEYJ101V	RES M 100-J-1/10W	
R643	ERJ6GEYJ101V	RES M 100-J-1/10W	
R653	ERDS2TJ101T	RES C 100-J-1/4W	
R654	ERDS2TJ184T	RES C 180K-J-1/4W	
R655	ERDS2TJ184T	RES C 180K-J-1/4W	
R704	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R706	ERDS1FJ680T	RES C 68-J-1/2W	
R708	ERF5AK4R7H	RES W 4.7-K-5W	
R800	D1F53R3EA001	RES M 3.3-1/2W	
R805	ERDS2TJ101T	RES C 100-J-1/4W	
R808	ERX12SZJR12P	RES M .12-J-1/2W	
R809	ERJ6GEYJ225V	RES M 2.2M-J-1/10W	
R810	ERX12SZJR12P	RES M .12-J-1/2W	
R811	ERX12SZJR12P	RES M .12-J-1/2W	
R812	ERDS2TJ103T	RES C 10K-J-1/4W	
R813	ERDS1FJ561T	RES C 560-J-1/2W	
R814	ERDS2TJ4R7T	RES C 4.7-J-1/4W	

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Ref. No.	Part No.	Part Name & Description	Remarks
R815	ERJ6GEYJ301V	RES M 300-J-1/10W	
R816	ERDS2TJ471T	RES C 470-J-1/4W	
R817	ERJ6ENF2001V	RES M 2K-F-1/10W	
R818	ERDS1FJ100T	RES C 10-J-1/2W	
R820	ERDS1FJ470T	RES C 47-J-1/2W	
R822	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R833	ERJ6GEYJ101V	RES M 100-J-1/10W	
R835	ERDS2TJ101T	RES C 100-J-1/4W	
R836	ERJ6GEYJ101V	RES M 100-J-1/10W	
R839	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R840	ERJ6GEYJ101V	RES M 100-J-1/10W	
R846	ERDS2TJ223T	RES C 22K-J-1/4W	
R847	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R857	ERX1SJ1R0P	RES M 1.0-J-1W	
R858	ERX1SJ1R0P	RES M 1.0-J-1W	
R859	ERDS2TJ103T	RES C 10K-J-1/4W	
R860	ERDS1FJ222T	RES C 2200-J-1/2W	
R862	ERG3FJ333H	RES M 33K-J-3W	
R865	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R866	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R867	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R870	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R871	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R872	ERJ6GEYJ333V	RES M 33K-J-1/10W	
R873	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R874	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R875	ERJ6ENF6191V	RES M 6190-F-1/10W	
R877	ERJ6ENF1781V	RES M 1.78K-F-1/10W	
R878	ERJ6ENF1001V	RES M 1K-F-1/10W	
R879	ERJ6ENF1001V	RES M 1K-F-1/10W	
R880	ERJ6ENF1001V	RES M 1K-F-1/10W	
R881	ERDS1TJ560T	RES C 56-J-1/2W	
R882	ERJ6ENF9530V	RES M 953-F-1/10W	
R883	ERJ6ENF6340V	RES M 634-F-1/10W	
R885	ERJ6ENF1001V	RES M 1K-F-1/10W	
R886	ERJ6ENF1001V	RES M 1K-F-1/10W	
R901	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R902	ERDS2TJ103T	RES C 10K-J-1/4W	
R903	ERDS2TJ683T	RES C 68K-J-1/4W	
R904	ERDS2TJ683T	RES C 68K-J-1/4W	
R905	ERDS2TJ103T	RES C 10K-J-1/4W	
R906	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R907	ERDS1FVJ470T	RES C 47-J-1/2W	
R908	ERDS1FVJ470T	RES C 47-J-1/2W	
R909	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R910	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R911	ERG3SJS221H	RES M 220-J-3W	
R912	ERDS2TJ101T	RES C 100-J-1/4W	
R913	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R914	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R915	ERQ14AJ220P	RES F 22-J-1/4W	
R916	ERQ14AJ220P	RES F 22-J-1/4W	
R917	ERQ14AJ100P	RES F 10-J-1/4W	
R918	ERDS2TJ472T	RES C 4.7K-J-1/4W	



Ref. No.	Part No.	Part Name & Description	Remarks
R919	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R920	ERDS2TJ681T	RES C 680-J-1/4W	
R921	ERDS2TJ151T	RES C 150-J-1/4W	
R925	ERDS2TJ151T	RES C 150-J-1/4W	
R926	ERDS2TJ151T	RES C 150-J-1/4W	
R928	ERQ14AJ220P	RES F 22-J-1/4W	
R929	ERDS2TJ101T	RES C 100-J-1/4W	
R940	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R941	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R942	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R943	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R944	ERDS2TJ681T	RES C 680-J-1/4W	
R945	ERDS2TJ681T	RES C 680-J-1/4W	
R946	ERQ14AJ100P	RES F 10-J-1/4W	
R947	ERQ14AJ220P	RES F 22-J-1/4W	
R948	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R949	ERDS2TJ103T	RES C 10K-J-1/4W	
R950	ERDS2TJ683T	RES C 68K-J-1/4W	
R951	ERDS2TJ683T	RES C 68K-J-1/4W	
R952	ERDS2TJ103T	RES C 10K-J-1/4W	
R953	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R954	ERDS1FVJ470T	RES C 47-J-1/2W	
R955	ERDS1FVJ470T	RES C 47-J-1/2W	
R956	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R957	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R958	ERG3SJS221H	RES M 220-J-3W	
R959	ERDS2TJ681T	RES C 680-J-1/4W	
R961	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R962	ERDS2TJ103T	RES C 10K-J-1/4W	
R963	ERDS2TJ683T	RES C 68K-J-1/4W	
R964	ERDS2TJ683T	RES C 68K-J-1/4W	
R965	ERDS2TJ103T	RES C 10K-J-1/4W	
R966	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R967	ERDS1FVJ470T	RES C 47-J-1/2W	
R968	ERDS1FVJ470T	RES C 47-J-1/2W	
R969	ERDS1FVJ4R7T	RES C 4.7-J-1/2W	
R970	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R971	ERG3SJS221H	RES M 220-J-3W	
R972	ERDS2TJ101T	RES C 100-J-1/4W	
R973	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R974	ERDS2TJ152T	RES C 1.5K-J-1/4W	
R975	ERQ14AJ100P	RES F 10-J-1/4W	
R976	ERQ14AJ220P	RES F 22-J-1/4W	
R977	ERDS2TJ151T	RES C 150-J-1/4W	
R978	ERQ14AJ220P	RES F 22-J-1/4W	
R979	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R980	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R981	ERDS2TJ681T	RES C 680-J-1/4W	
R1322	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1323	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1324	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1325	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1326	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1327	ERJ6GEYJ101V	RES M 100-J-1/10W	

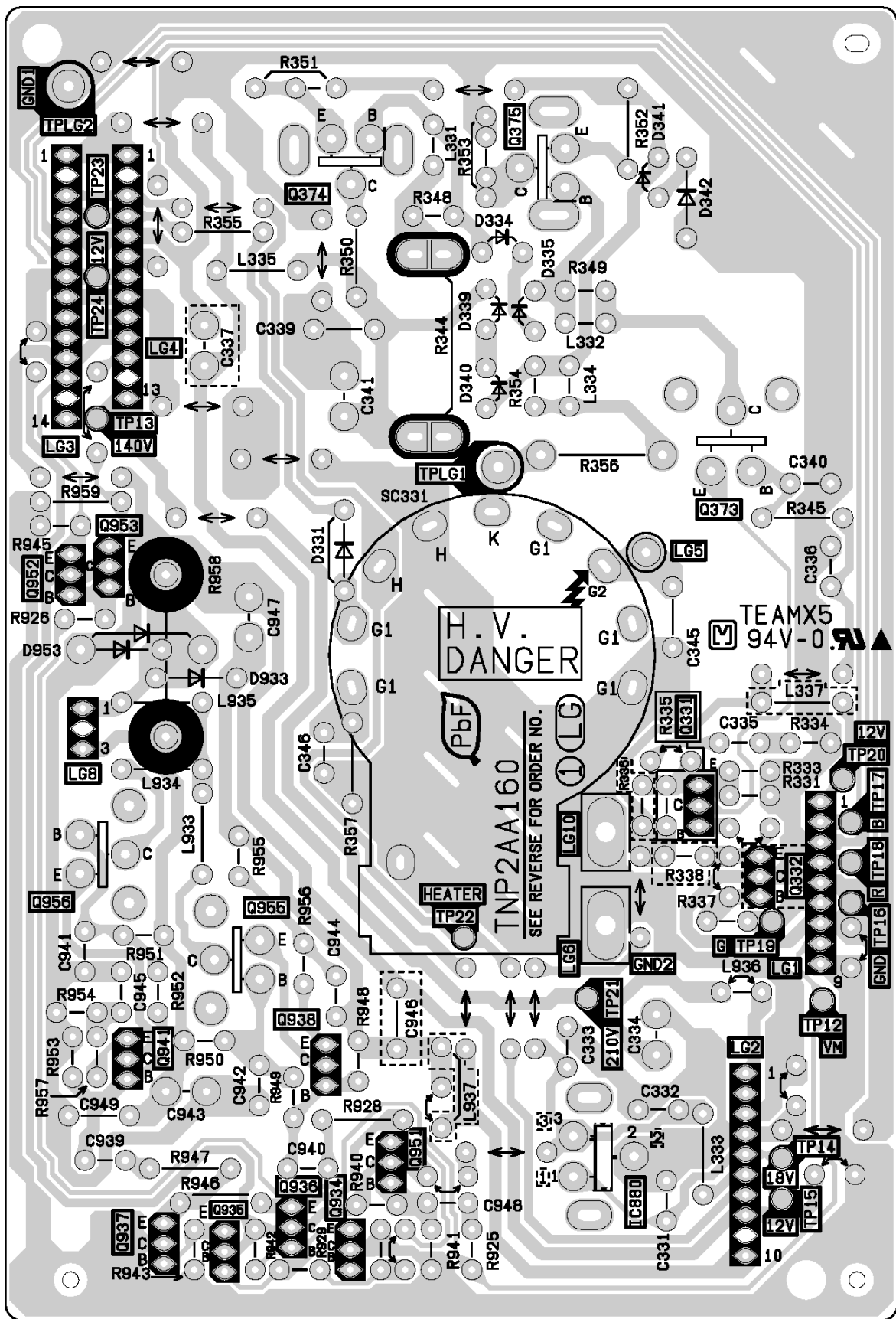
Ref. No.	Part No.	Part Name & Description	Remarks
R1329	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1330	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1331	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1332	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1338	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R1502	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R1503	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1504	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1505	EROS2THF1331	RES M 1.33K-F-1/4W	
R1506	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1507	ERG3SJD152L	RES M 1.5K-J-3W	
R1508	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R1509	ERDS2TJ102T	RES C 1K-J-1/4W	
R1510	ERG2SJD333L	RES M 33K-J-2W	
R1511	ERG2SJD333L	RES M 33K-J-2W	
R1512	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1514	ERG2SJD333L	RES M 33K-J-2W	
R1515	ERJ6ENF1001V	RES M 1K-F-1/10W	
R1516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1517	ERJ6ENF3571V	RES M 3.57K-F-1/10W	
R1518	ERG2SJD333L	RES M 33K-J-2W	
R1519	ERDS2TJ101T	RES C 100-J-1/4W	
R1520	ERDS2TJ221T	RES C 220-J-1/4W	
R1521	EROS2THF1500	RES M 150-F-1/4W	
R1522	ERC12GK103D	RES C 10K-K-1/2W	
R1523	ERDS2TJ104T	RES C 100K-J-1/4W	
R1524	EROS2THF1401	RES M 1.4K-F-1/4W	
R1527	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1528	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R1529	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R1532	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1542	ERG2SJD333L	RES M 33K-J-2W	
R1544	ERJ6GEYJ471V	RES M 470-J-1/10W	
R1546	ERJ6GEYJ221V	RES M 220-J-1/10W	
R1599	ERJ6ENF9761V	RES M 9760-F-1/10W	
R2201	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R2202	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2203	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2204	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2302	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2307	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2309	ERJ12YJ101U	RES M 100-J-1/2W	
R2310	ERJ6ENF5232V	RES M 5.32K-F-1/10W	
R2312	ERJ6ENF4701V	RES M 4.7K-F-1/10W	
R2315	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2316	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2320	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2321	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2322	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2324	ERJ6ENF1303V	RES M 130K-F-1/10W	
R2326	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2328	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2331	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2333	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	

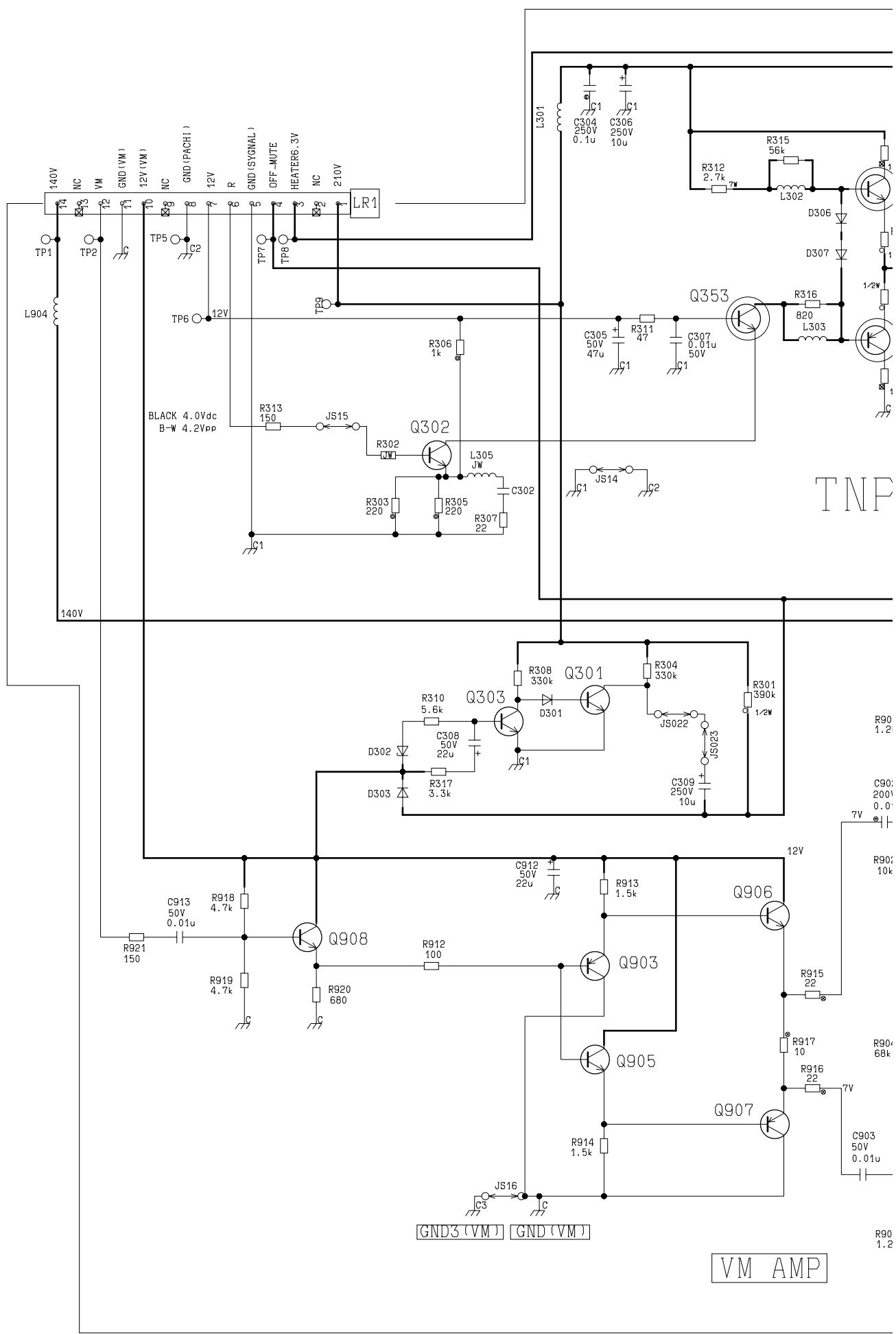
Ref. No.	Part No.	Part Name & Description	Remarks
R2334	ERJ6ENF4701V	RES M 4.7K-F-1/10W	
R2336	ERJ6ENF5232V	RES M 5.32K-F-1/10W	
R2337	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2339	ERJ12YJ101U	RES M 100-J-1/2W	
R2341	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2342	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2343	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2344	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2345	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2346	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2347	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2348	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2349	ERJ6GEYJ271V	RES M 270-J-1/10W	
R2350	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2351	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2352	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2353	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2354	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2356	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R2357	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2358	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2359	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2360	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2361	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2362	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2363	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2364	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2365	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2366	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2367	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2378	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2380	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2391	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2420	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2432	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2434	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2451	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2452	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2453	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2454	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2455	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2456	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2457	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2458	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R2459	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2460	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2461	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R3201	ERJ6GEYJ750V	RES M 75-J-1/10W	
R3202	ERJ6GEYJ750V	RES M 75-J-1/10W	
R3301	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3302	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3303	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3304	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3305	ERJ6GEYJ184V	RES M 180K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R3306	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3307	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3308	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3309	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3310	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3311	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3312	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3313	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3314	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3315	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3316	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3317	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3318	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3319	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3320	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3321	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3322	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3323	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3324	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3326	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3327	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3328	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R7001	ERG2FJ820H	RES M 82-J-2W	
R7002	ERG2FJ121H	RES M 120-J-2W	
R7003	ERG2FJ820H	RES M 82-J-2W	
R7004	ERG2FJ121H	RES M 120-J-2W	
R7005	ERG2FJ820H	RES M 82-J-2W	
R7006	ERG2FJ121H	RES M 120-J-2W	
R7011	ERX2FJ2R2H	RES M 2.2-J-2W	
R7012	ERX2FJ2R2H	RES M 2.2-J-2W	
R7013	ERX2FJ2R2H	RES M 2.2-J-2W	
R7014	ERX2FJ2R2H	RES M 2.2-J-2W	
R7015	ERX2FJ2R2H	RES M 2.2-J-2W	
R7016	ERX2FJ2R2H	RES M 2.2-J-2W	
R7023	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7024	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7026	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7027	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7029	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7030	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7031	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7032	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7034	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7035	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7036	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7037	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7038	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7040	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7041	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7045	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7046	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7047	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7048	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7052	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R7055	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7058	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7059	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R7060	ERX1SJR27P	RES M .27-J-1W	
R7061	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7062	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7063	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7064	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7065	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7066	ERX1SJR27P	RES M .27-J-1W	
SWITCHES			
SW080	EVQPBD05R	SWITCH	
SW081	EVQPBD05R	SWITCH	
SW082	EVQPBD05R	SWITCH	
SW083	EVQPBD05R	SWITCH	
SW084	EVQPBD05R	SWITCH	
SW085	EVQPBD05R	SWITCH	
SW086	EVQPBD05R	SWITCH	
SW087	EVQPBD05R	SWITCH	
SW088	EVQPBD05R	SWITCH	
TRANSFORMERS			
T501	ETH19K204AZ	TRANSFORMER	
T551	TLF2AA009	TRASNFORMER FLYBACK	⚠
T801	ETS42AD495AD	TRANSFORMER	⚠
T802	ETP30KB941JG	TRANSFORMER	⚠
OTHERS			
TU001	ENG6302GF	MAIN TUNER	⚠
TU002	ENG36A08GF	SUB-TUNER	⚠
M001	TSX2AA0421	AC LINE CORD	⚠
1	TXFCRT37JSER	CRT(BLUE)	
	TXFCRT38JSER	CRT(GREEN)	
	TXFCRT39JSER	CRT(RED)	
M002	TJS2AC0051	CRT SOCKET	⚠
2	KDY2ASF83F	DEFLECTION YOKE	⚠
M003	TXF3A01ECV	DAG GND	⚠
3	TKG2AF021-1	A/B LENS	
4	TKG2AA50111	MIRROR GLASS	
5	TMW2AX0041B	MIRROR BRACKET (SIDE)	
6	TMW2AX0161	MIRROR BRACKET (TOP)	
7	TKG2AD00131	SCREEN PROTECTIVE	
8	TKG2AH50381	SCREEN LENTICULAR	
9	TKG2AH50611	SCREEN FRESNEL	
10	TKE2AA00902S	SCREEN FRAME	
11	TKP2AA1032S	SCREEN FRAME COVER	
12	TKU2AC4101S	BACK CABINET	
13	TXFKP07JSER	TOP SHELF	
14	TKD2AX5011S	FRONT BOARD	
15	TKP2AA1042S	FRONT COVER	
16	TKP2AA1071S	RIGHT SIDE PANEL	
	TKP2AA1072S	LEFT SIDE PANEL	
17	TKX2AA0221S	PLASTIC BASE	

Ref. No.	Part No.	Part Name & Description	Remarks
18	TKD2AX2831S	INNER BOARD	
19	TKU2AC4201S	LOWER BACK CABINET	
20	EAST6PH08P6	SPEAKER (TWEETER)	
	TAS2AA0022	SPEAKER (TWEETER)	
21	EAST16P51A6	SPEAKER (WOOFER)	
	TAS2AA0027	SPEAKER (WOOFER)	
22	TKP2AA1101S	SPEAKER BASE COVER	
23	TKP2AA1052S	SPEAKER GRILLE	
24	TLH2AH001	DISTRIBUTOR	
25	D9ZZ00000079	FOCUS PACK	
M004	TMX2AX0031	FOCUS BRACKET	
26	TKP2AA1062	SD-A/V PANEL	
M005	TBX2AA0241	DISC BUTTON	
27	TBX2AA0271	KEY BUTTON	
M006	TKP2AA1131	LED PANEL	
M007	TMM2AE10171	GROMMET SQUARE	
28	TXFKP08JSER	A/V REAR COVER	
JK1001	TJB2AA0482	TERMINAL A/V FRONT	
JK3301	TJB2AA0521	CONNECTOR (COMPONENT INPUT)	
JK3302A	TJB2AA0532	CONNECTOR (A/V INPUT)	
JK5001	K1FA119E0001	HDMI CONNECTOR	
OTHER ACCESSORIES			
M008	TQB2AA0506	OWNER'S MANUAL	
M009	EUR7603ZF0	TRANSMITTER REMOTE CONTROL	
M010	UR76EC0303E	BATTERY COVER(REMOTE CONTROL)	

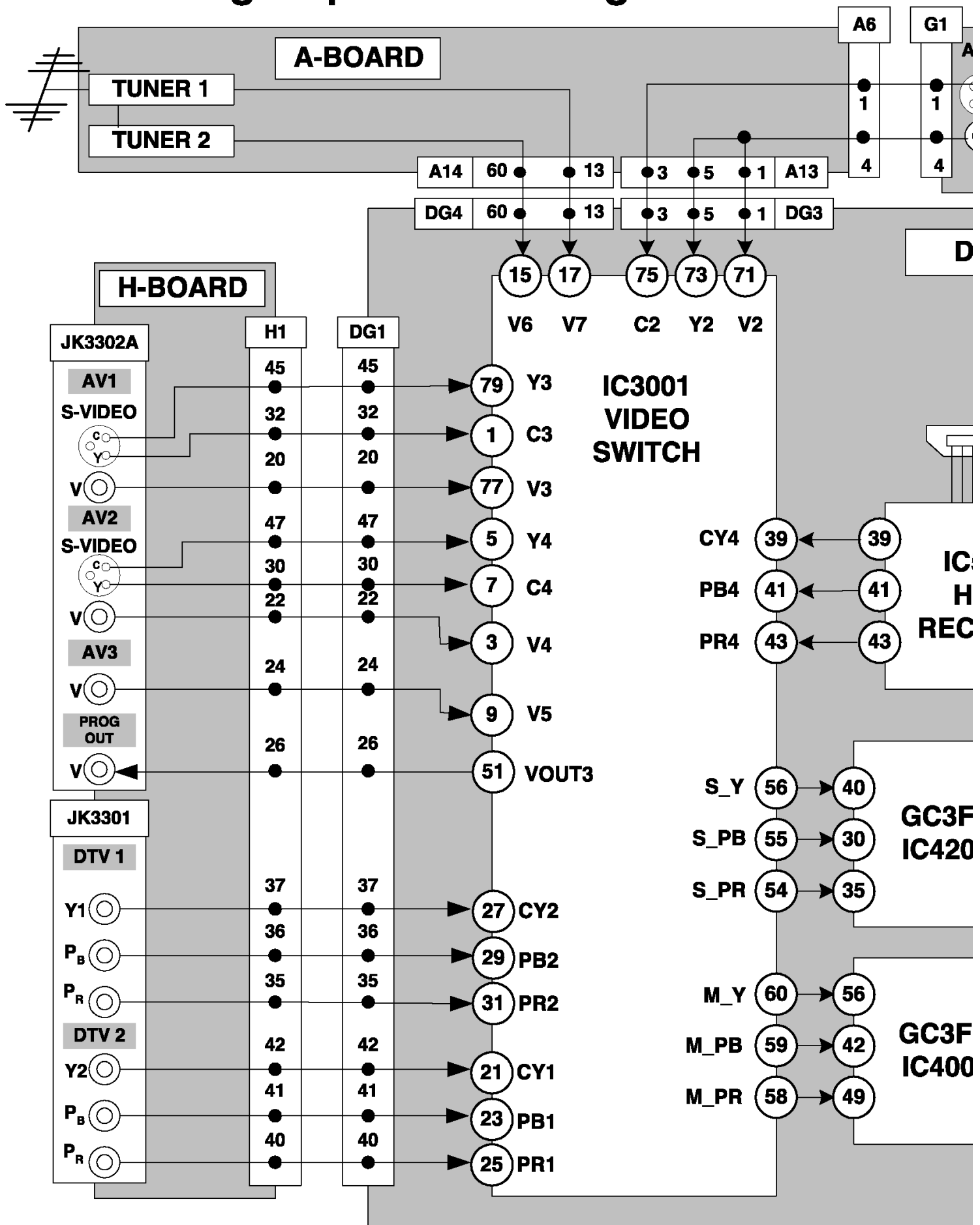




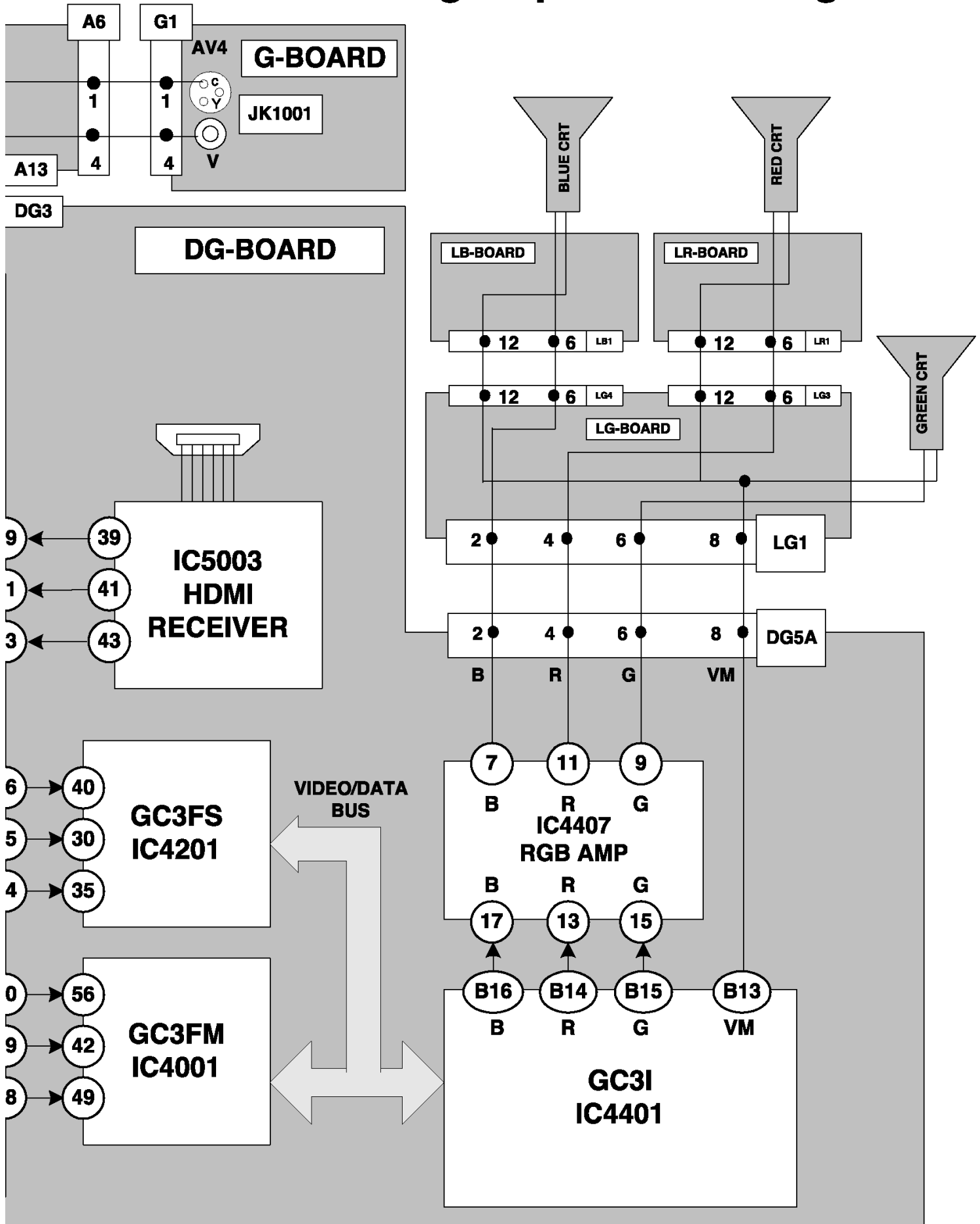
TNF

VM AMP

Video signal path block diagram



Video signal path block diagram



A - BOARD - TNP2AH058

IC1302		IC2201				IC2401				IC872		IC876																							
1	0.00	1	1.60	13	2.80	1	4.40	16	8.90	1	19.40	1	19.40																						
2	0.00	2	2.20	14	2.20	2	4.50	17	4.70	2	9.01	2	2.60																						
3	0.00	3	2.20	15	2.50	3	4.50	18	0.00	3	0.00	3	0.00																						
4	0.00	4	2.30	16	3.50	4	4.50	19	4.30	4	1.30	4	1.30																						
5	2.30	5	2.40	17	0.00	5	4.50	20	4.10	5	N.C.	5	N.C.																						
6	2.60	6	0.07	18	3.20	6	4.50	21	4.50	IC874		IC877																							
7	0.00	7	5.00	19	3.40	7	4.50	22	4.50																										
8	3.30	8	2.50	20	0.00	8	4.50	23	4.50																										
IC1303		9	2.60	21	2.20	9	1.60	24	4.50																										
		10	0.80	22	2.20	10	4.50	25	4.50																										
		11	2.30	23	2.20	11	1.60	26	4.50																										
		12	2.50	24	2.20	12	1.60	27	4.50																										
		IC2301			IC2303	13	4.90	28	4.50	1	19.40	1	19.40																						
14	4.90					29	4.50	2	5.10	2	1.78																								
15	0.00					30	4.40	3	0.00	3	0.00																								
IC2303						IC875		IC875		IC875																									
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A - BOARD - TNP2AH058

	Q2301	Q2302	Q2303	Q2304	Q2305	Q2306	Q2307
B	-0.02	19.60	0.02	14.16	0.00	0.00	-0.03
C	5.05	-0.02	19.60	13.57	-0.02	0.00	0.00
E	0.00	13.57	0.00	14.16	-0.04	-0.04	0.00
	Q2308	Q2309	Q882	Q883	Q2451	Q2452	
B	0.70	0.00	6.49	4.36	4.54	4.54	
C	0.00	5.04	0.00	0.05	9.02	9.02	
E	0.00	0.00	6.47	0.00	3.90	3.90	

D - BOARD - TNP2AH059

IC1501	IC701	IC7001				↓IC801	IC811
110.80 20.00 30.00 40.00 52.40 62.40 71.40 812.00	10.20 25.30 34.70 40.00 51.60 60.70 79.50 812.00	1 0.00 2 0.00 3-19.40 4-20.50 519.30 6-0.30 7-0.30 8-20.40 9-0.30	1019.30 110.00 12-20.50 130.00 140.00 15-0.20 16-0.20 17-20.50 180.00			1 1.40 2 0.40 3 0.00 4 0.00 5 0.00 6 5.70 720.50 8 0.00 9 6.00	1 19.50 2 18.50 3 ↓ ... 0.00 4 ↓ ... 5.90
IC451	IC7002				IC802	IC805	
10.00 217.30 3 ...-17.00 4 ...-18.50 5-0.10 617.10 70.00	1 0.00 2 0.00 3-19.40 4-20.50 519.30 6-0.10 7-0.10 8-20.40 9-0.10	1019.30 11-0.40 12-0.40 130.20 140.00 15-0.20 16-0.00 17-20.50 180.00			1 ... 139.40 2 18.50 3 0.00	1 19.70 2 0.00 3 12.00	

	Q1503	Q1504	Q1505	Q406		Q501		Q509	Q510	Q512
B	9.80	12.00	6.10	-0.70	G	5.30	B	29.10	31.60	4.40
C	6.20	404.80	10.40	0.00	D	16.50	C	138.90	138.90	8.30
E	10.40	11.40	6.60	0.00	S	0.00	E	31.60	31.10	3.80
	Q513	Q551	Q606		Q701		Q7006	Q7007	Q7060	Q7061
B	0.30	-0.20	0.00	G	9.50	B	-20.50	-20.50	19.30	-20.50
C	5.30	-98.90	9.80	D	27.00	C	-19.40	-19.40	0.00	19.30
E	0.00	0.00	0.00	S	0.00	E	-20.50	-20.50	19.50	-20.70
	Q801		Q802	Q803	Q854					
G	5.50	B	0.70	20.50	138.90					
S	0.01	C	0.20	0.00	0.00					
D	43.30	E	0.00	20.50	139.20					

LG - BOARD - TNP2AA160

IC880		Q331	Q373	Q374	Q375	Q934	Q935	Q936	Q937
1 18.30	B	4.10	12.00	172.10	171.00	0.00	0.00	0.70	0.00
2 0.00	C	11.60	170.70	218.80	0.40	0.00	19.30	19.30	0.00
3 12.00	E	3.80	11.60	171.60	171.60	0.70	0.00	0.40	0.40
		Q938	Q941	Q951	Q952	Q953	Q955	Q956	
	B	137.90	1.00	-0.90	-1.10	-1.10	129.70	9.60	
	C	130.10	9.00	19.30	19.30	19.30	70.00	70.00	
	E	138.60	0.30	0.00	0.00	0.00	130.10	9.00	

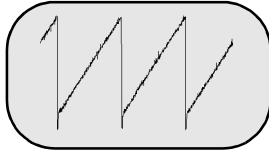
LB - BOARD - TNP2AA161

	Q361	Q362	Q363	Q364	Q365	Q366	Q368	Q393	Q394
B	5.20	4.50	3.90	3.90	5.90	5.10	0.00	12.00	176.10
C	12.00	12.00	11.50	0.00	12.00	12.00	0.00	174.80	218.00
E	4.50	3.90	3.70	3.50	5.30	4.50	0.40	11.60	175.70
	Q395	Q959	Q960	Q961	Q964	Q965	Q966	Q967	Q968
B	174.60	129.40	9.60	137.90	1.00	0.00	0.00	0.70	0.00
C	0.40	71.00	71.00	130.00	9.00	0.00	19.30	19.30	0.00
E	175.40	130.00	9.10	138.50	0.40	0.70	0.00	0.40	0.40

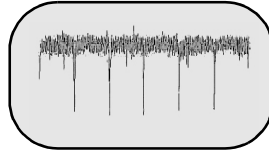
LR - BOARD - TNP2AA162

	Q301	Q302	Q303	Q353	Q354	Q355	Q901
B	0.00	0.60	0.60	12.00	176.30	175.00	137.90
C	215.00	0.00	0.00	174.70	218.30	0.00	130.10
E	0.00	0.00	0.00	11.50	175.90	175.60	138.50
	Q903	Q904	Q905	Q906	Q907	Q957	Q958
B	0.10	1.00	0.10	0.70	0.00	129.40	9.43
C	0.00	8.90	19.30	19.30	0.00	69.60	69.60
E	0.80	0.30	0.00	0.40	0.40	130.00	8.86

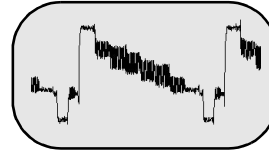
A-Board TNP2AH058



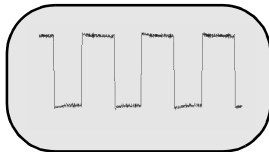
① **2.04 Vp-p**
A4 PIN 1 (V-SAW)



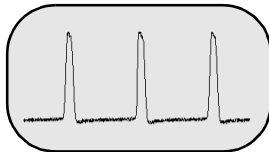
② **.292 Vp-p**
A4 PIN 4 (EHT ADJ)



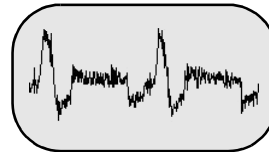
③ **1.08 Vp-p**
A14 PIN 13 (MAIN VIDEO)



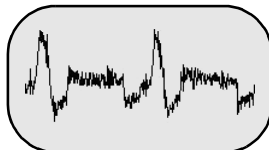
④ **3.56 Vp-p**
A2 PIN 3 (H-DRV)



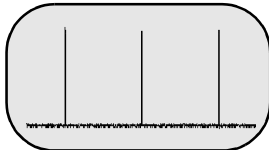
⑤ **5.65 Vp-p**
A2 PIN 5 (FBP)



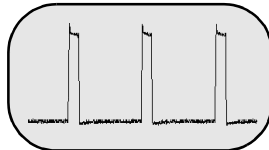
⑥ **0.178 Vp-p**
A2 PIN 11 (SOS3 CONV)



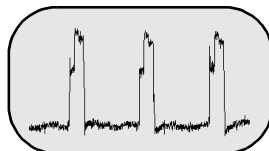
⑦ **0.176 Vp-p**
A2 PIN 15 (SOS)



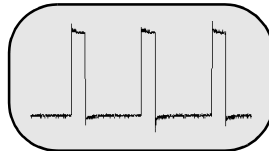
⑧ **3.36 Vp-p**
A3 PIN 9 (VD TO CONV)



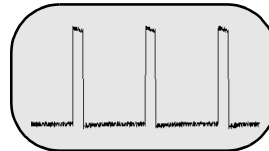
⑨ **3.36 Vp-p**
A3 PIN 11 (FBP TO CONV)



⑩ **0.472 Vp-p**
A3 PIN 13 (H-SYNC)

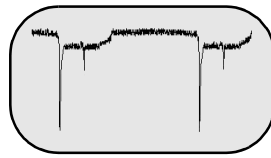


⑪ **3.52 Vp-p**
A3 PIN 15 (HBLK)

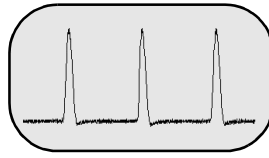


⑫ **3.6 Vp-p**
A3 PIN 16 (EW)

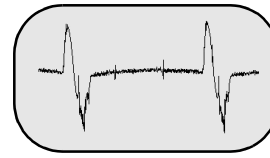
D-Board TNP2AH059



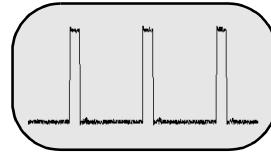
⑬ 12.6 Vp-p
Q551-B



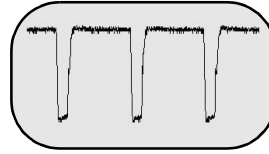
⑭ 1.56 kVp-p
Q551-C



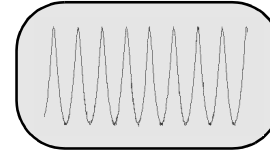
⑮ 0.65 Vp-p
IC701 PIN 3



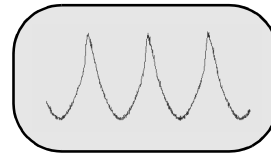
⑯ 3.60 Vp-p
IC701 PIN 6



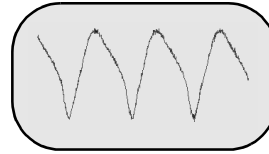
⑰ 13.4 Vp-p
IC701 PIN 7



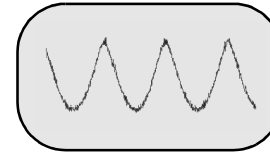
⑱ 2.28 Vp-p
D23 PIN 10 (DAF)



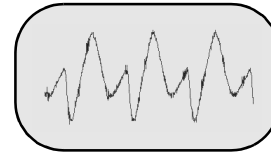
⑲ 2.02 Vp-p
D22 PIN 2 BV



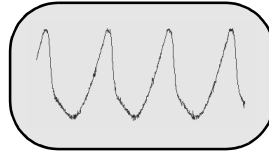
⑳ 2.04 Vp-p
D22 PIN 3 (BH)



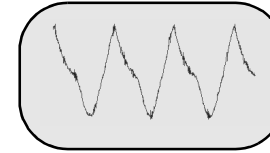
㉑ 1.44 Vp-p
D22 PIN 4 (GV)



㉒ .824 Vp-p
D22 PIN 5 (GH)

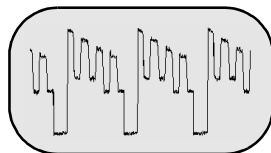


㉓ 1.94 Vp-p
D22 PIN 6 (RV)

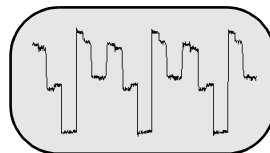


㉔ 1.17 Vp-p
D22 PIN 7 (RH)

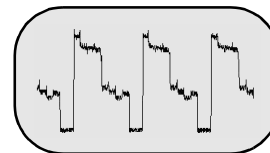
LG-Board TNP2AA160



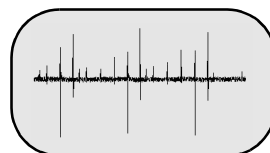
㉕ 6.08 Vp-p
TP17 (BLUE SIGNAL)



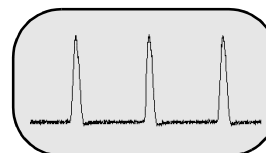
㉖ 5.60 Vp-p
TP18 (RED SIGNAL)



㉗ 6.08 Vp-p
TP19 (GREEN SIGNAL)

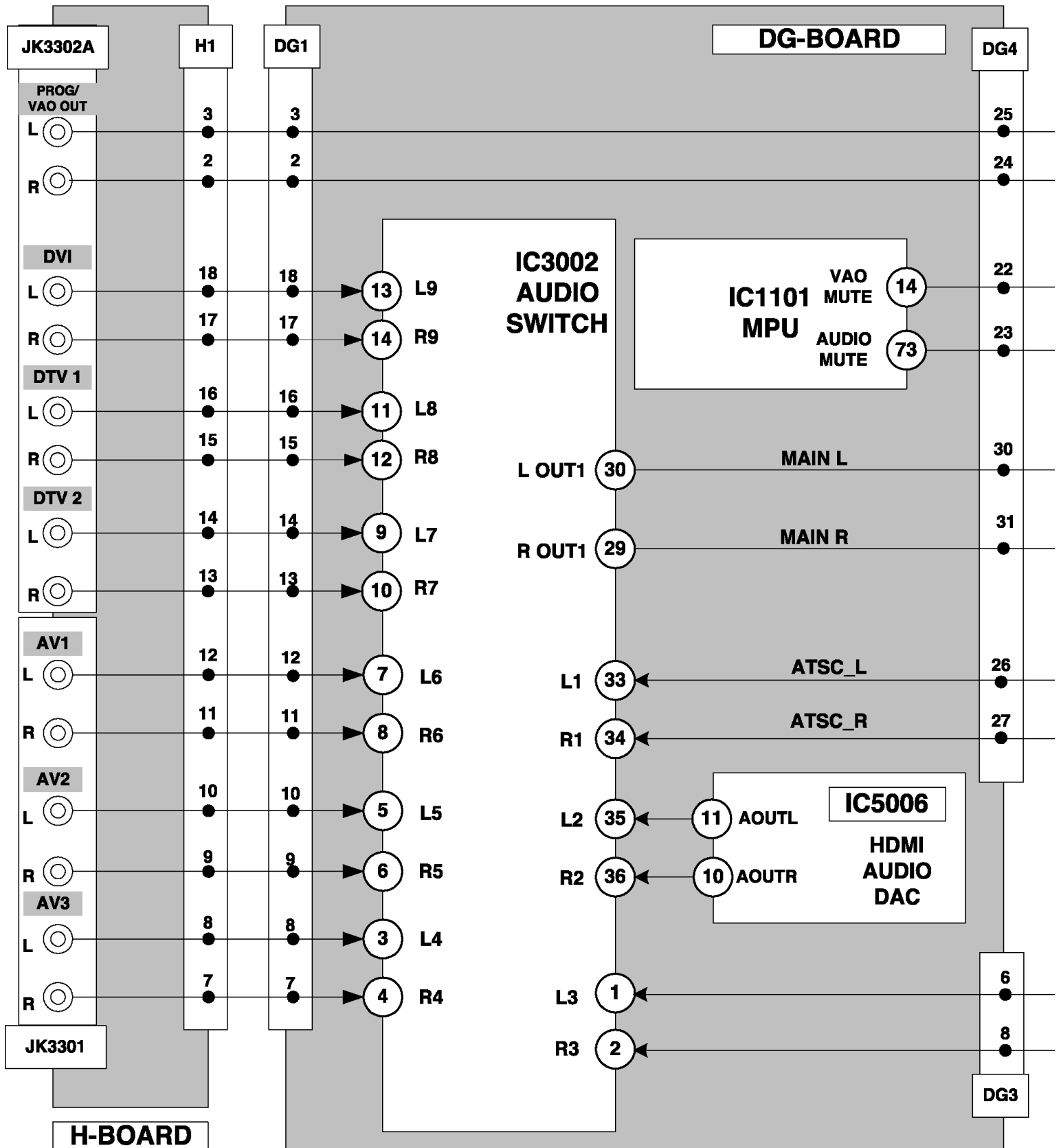


㉘ 2.74 Vp-p
TP12 (VM SIGNAL)

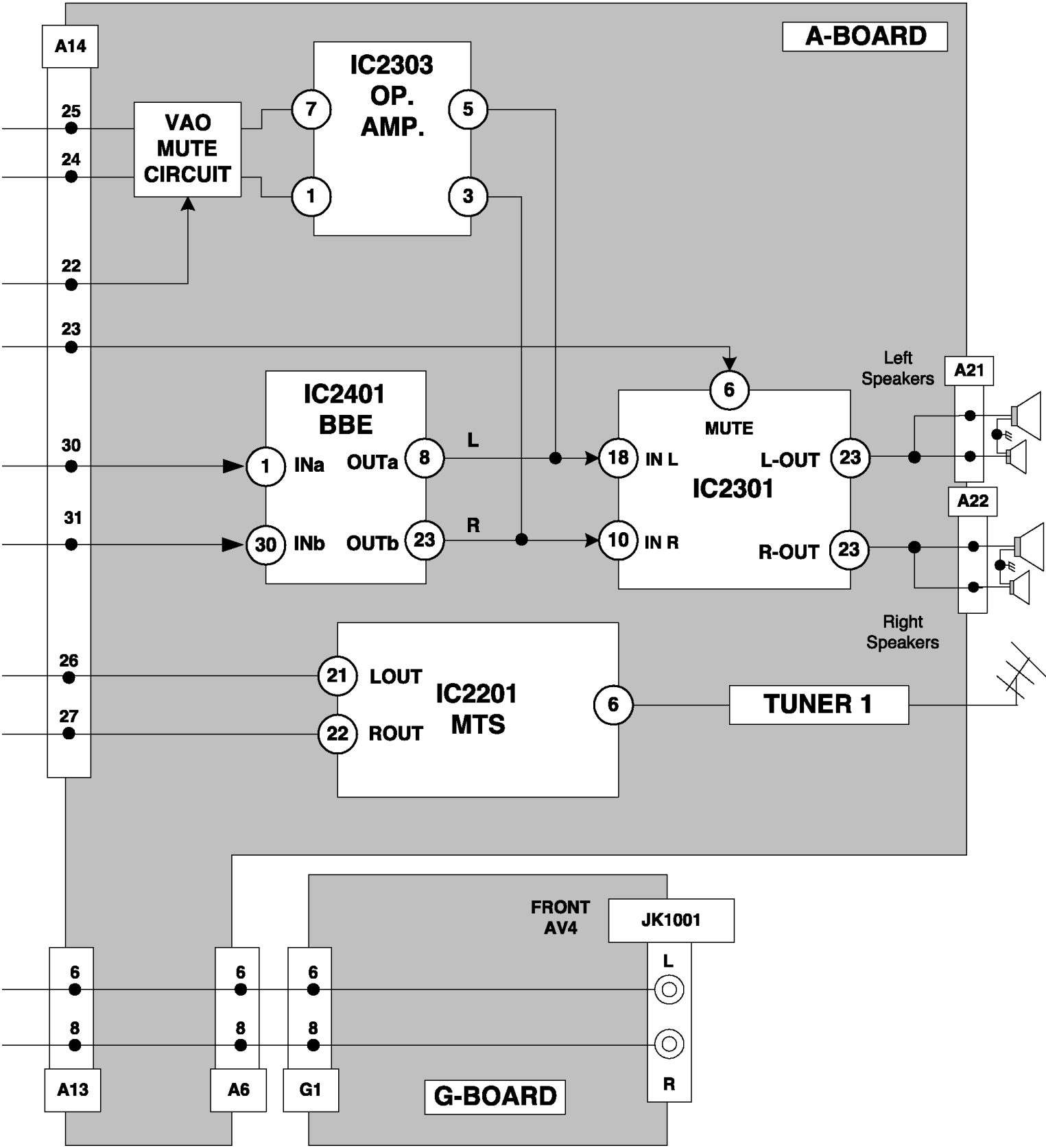


㉙ 28.4 Vp-p
TP22 (HEATER)

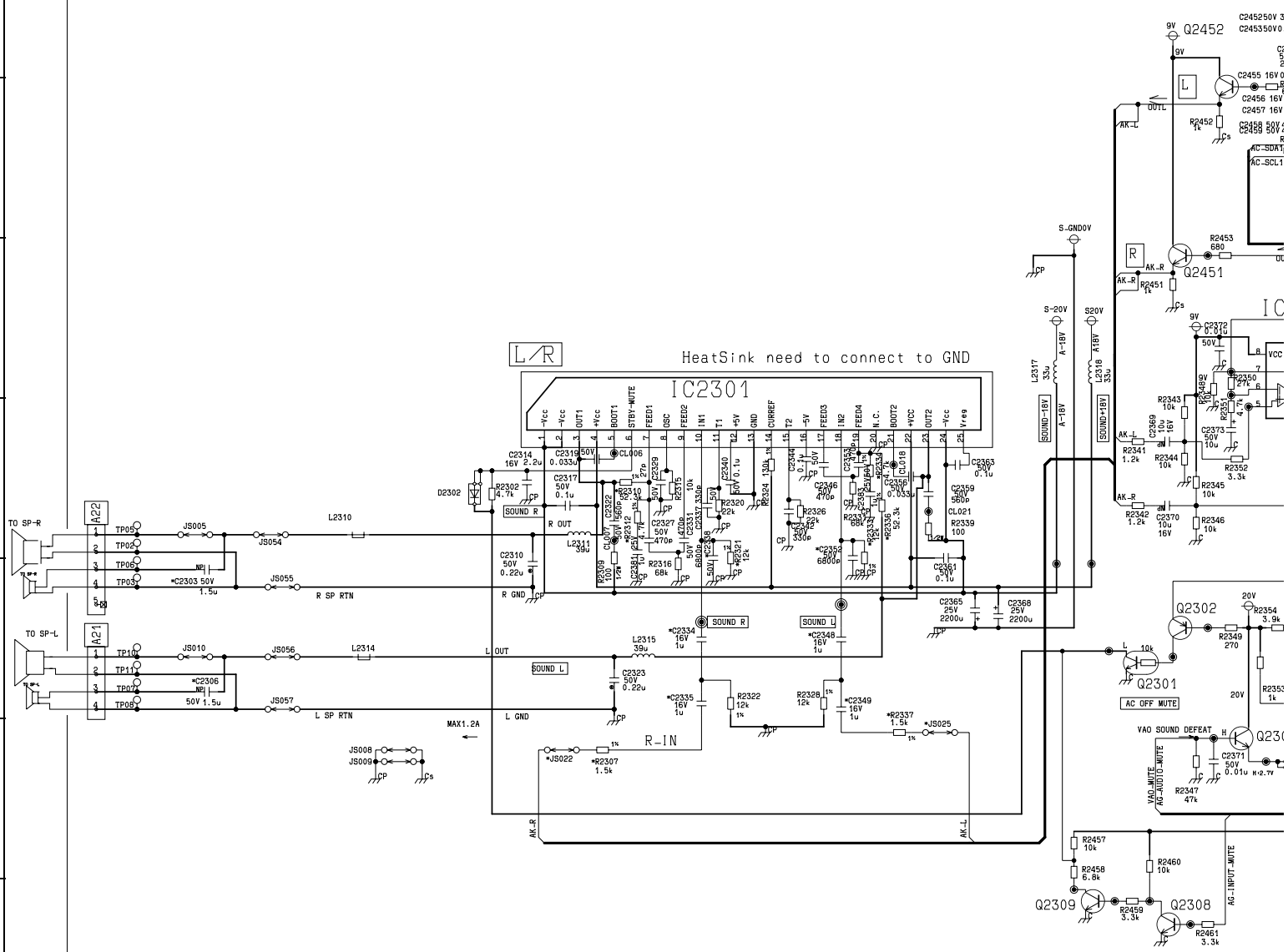
Audio signal path block diagram



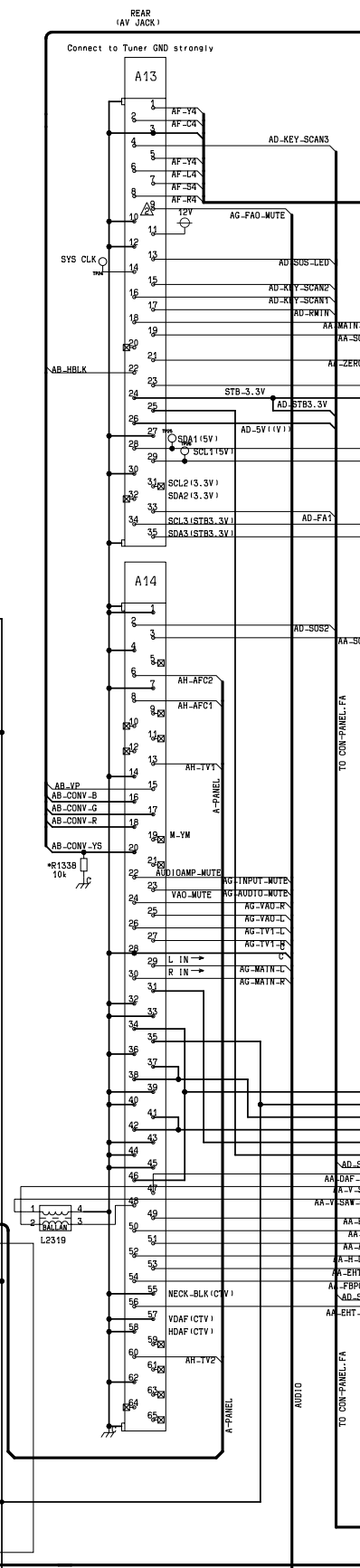
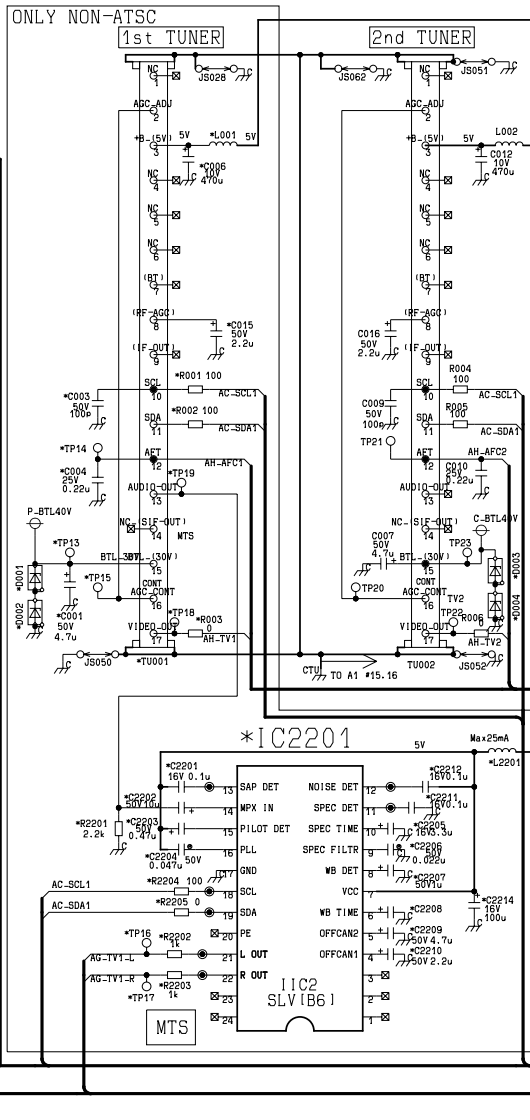
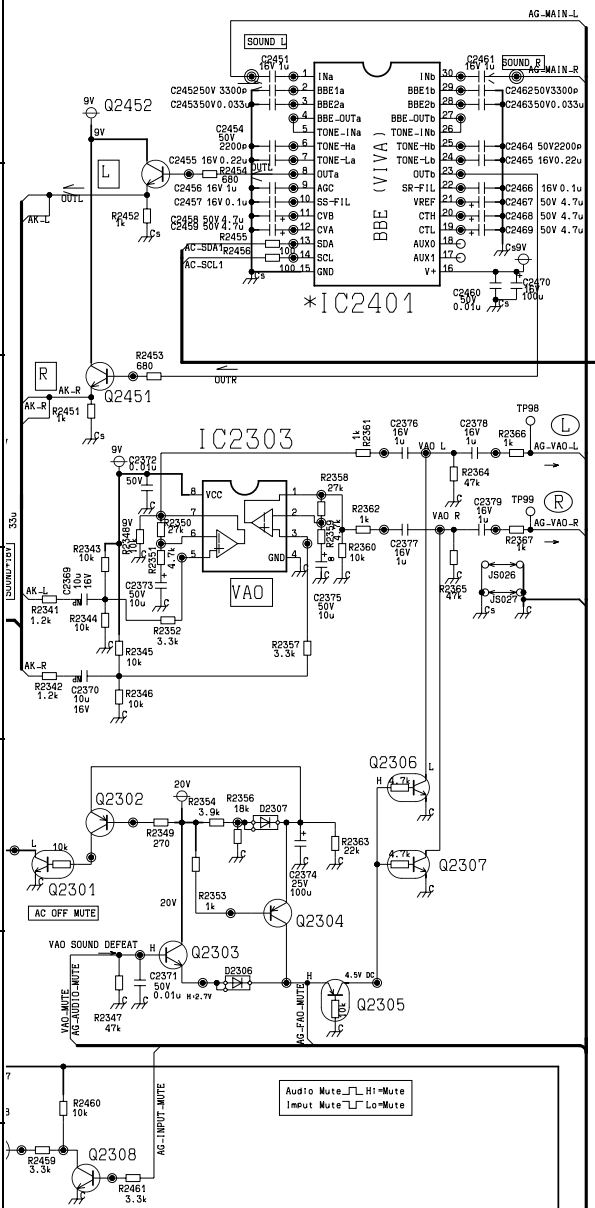
Audio signal path block diagram

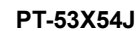


TNP2



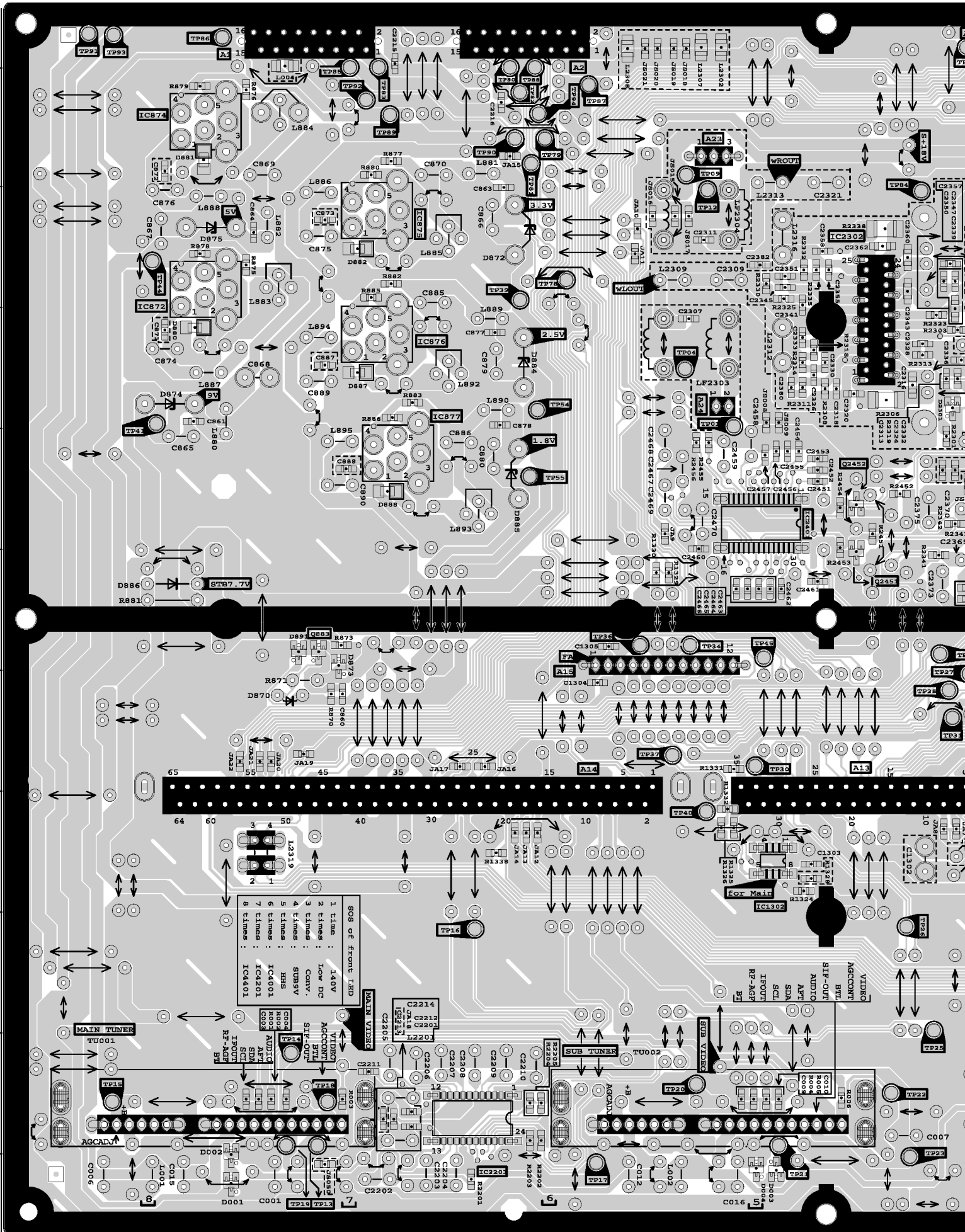
TNP2AH058 (A)

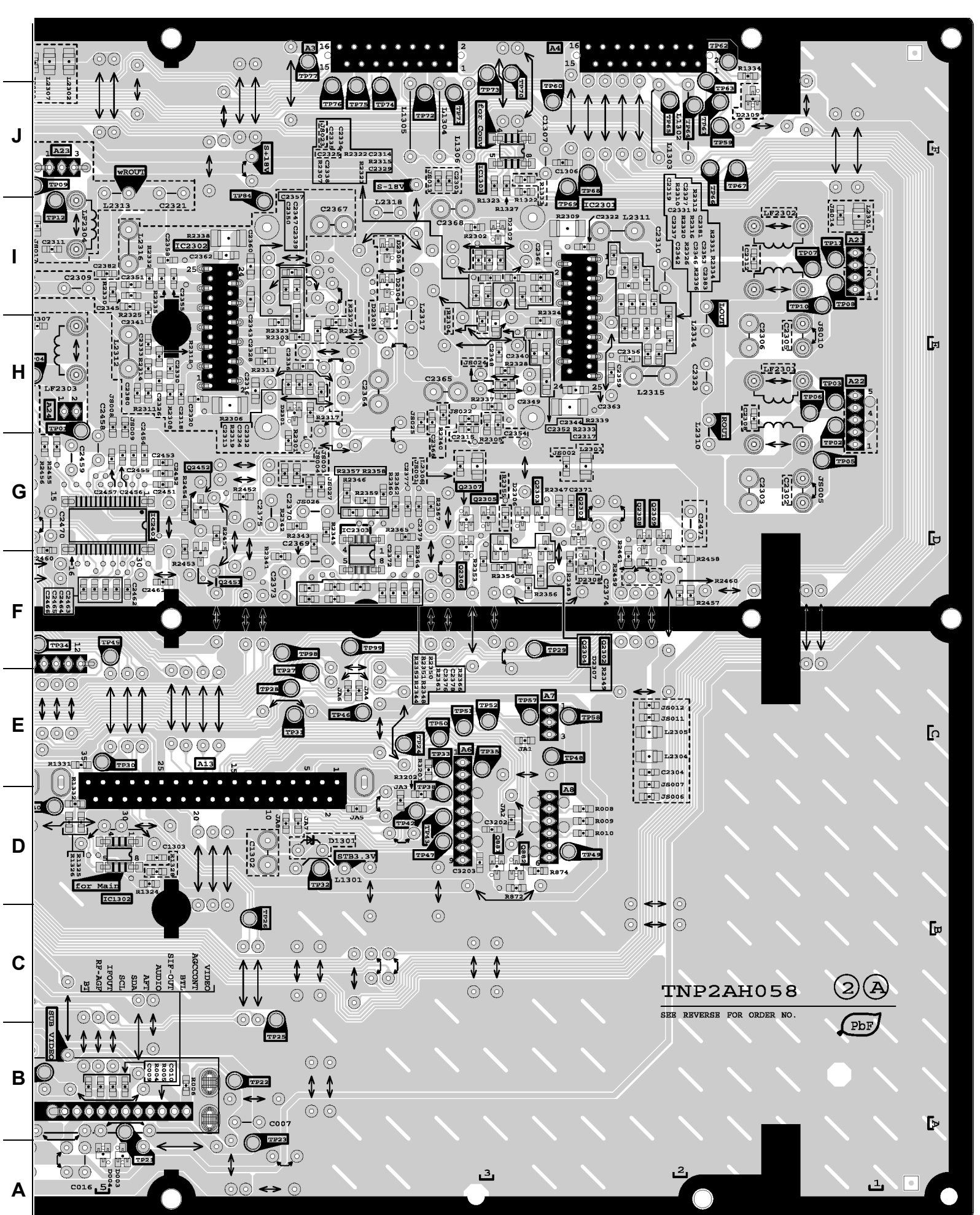




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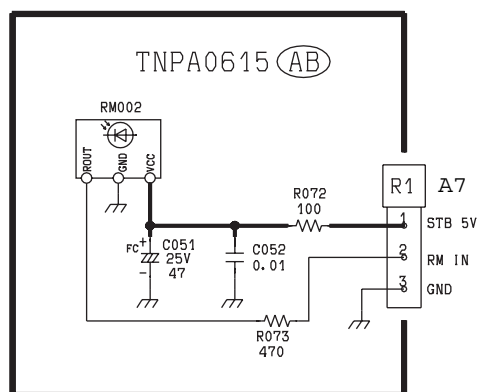
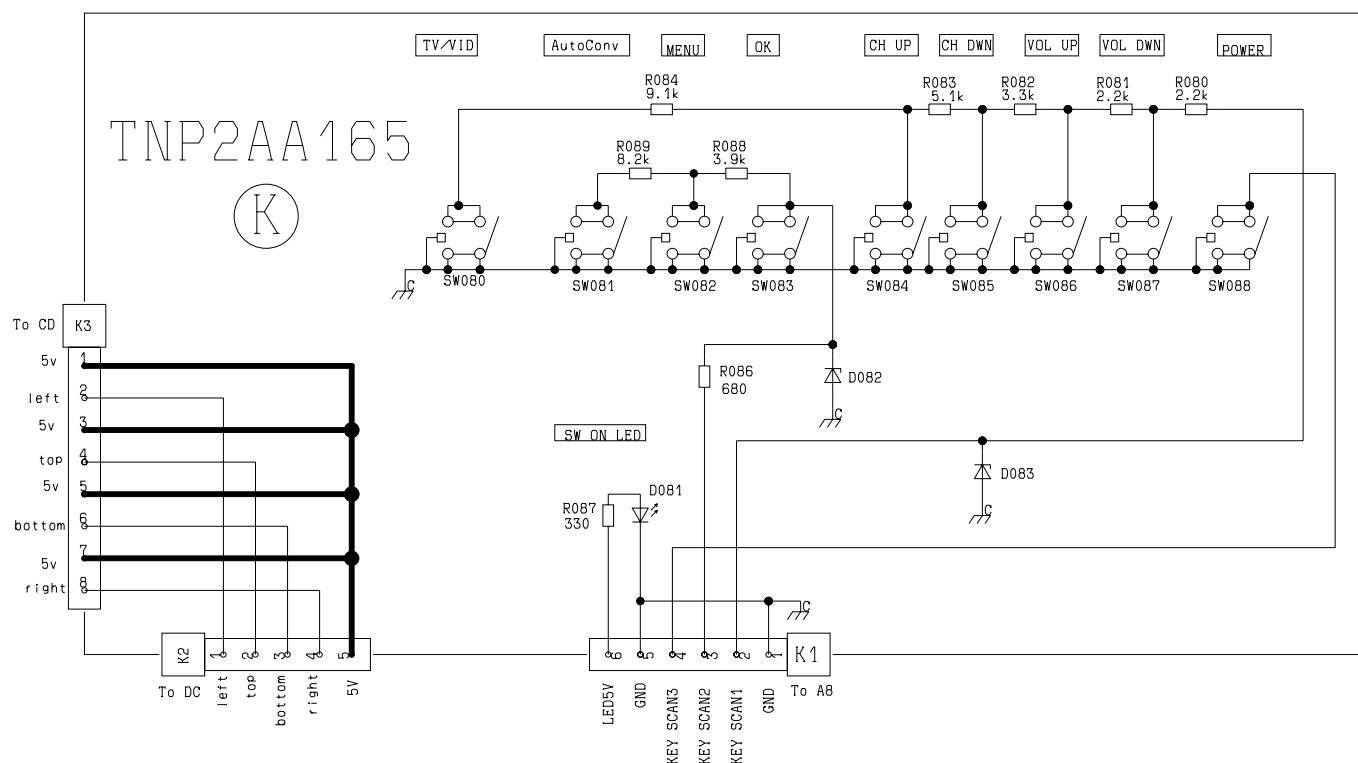
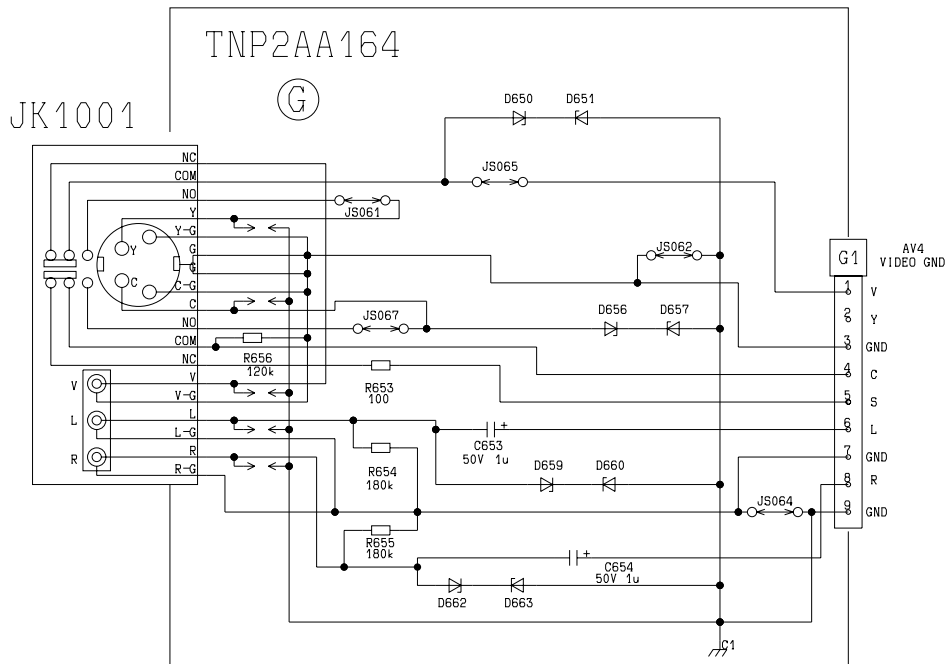
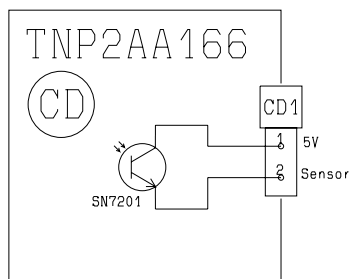


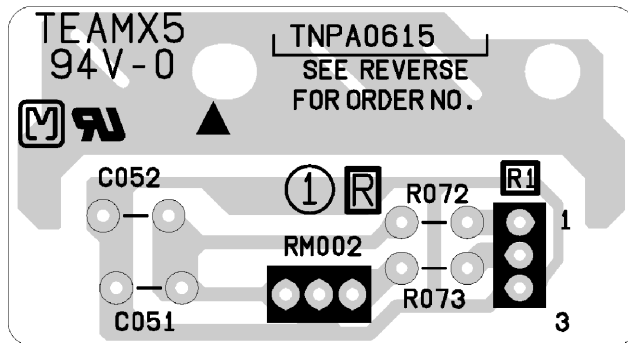
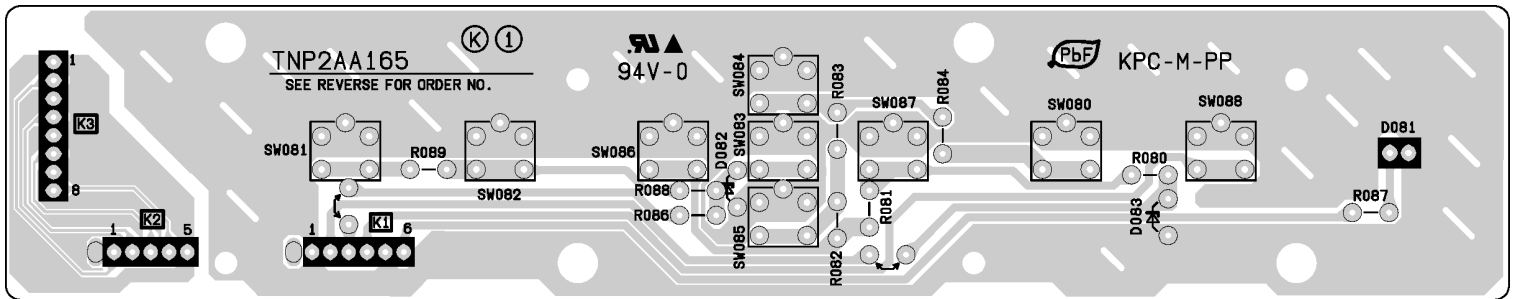
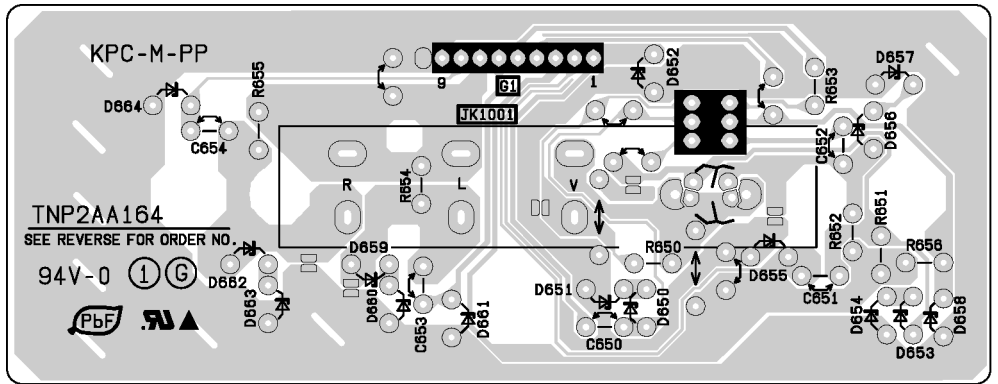
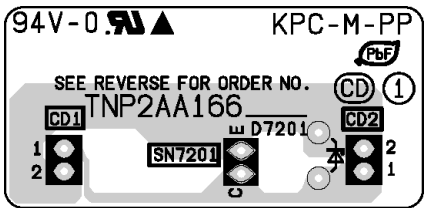
TNP2AH058

SEE REVERSE FOR ORDER NO.

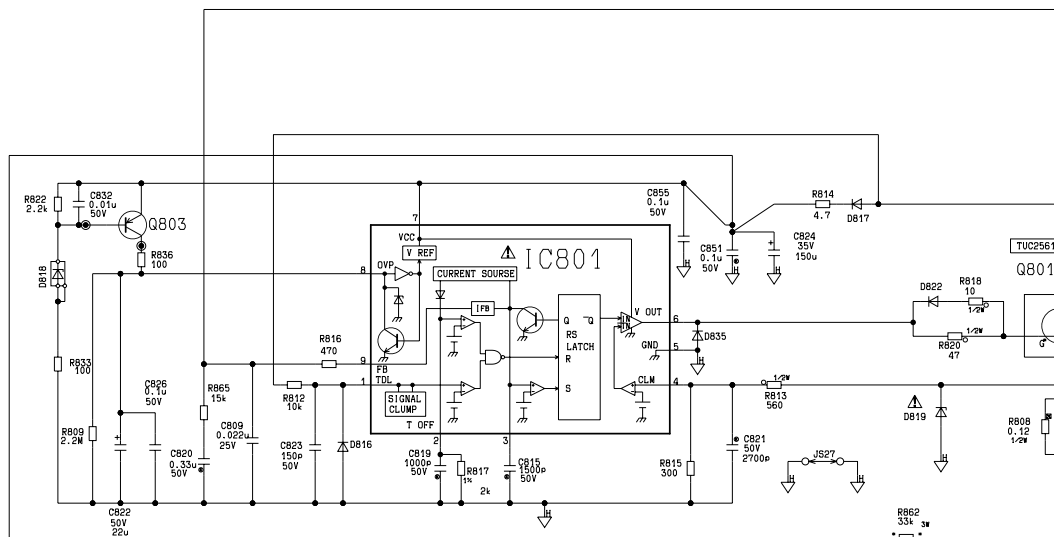
(2) (A)

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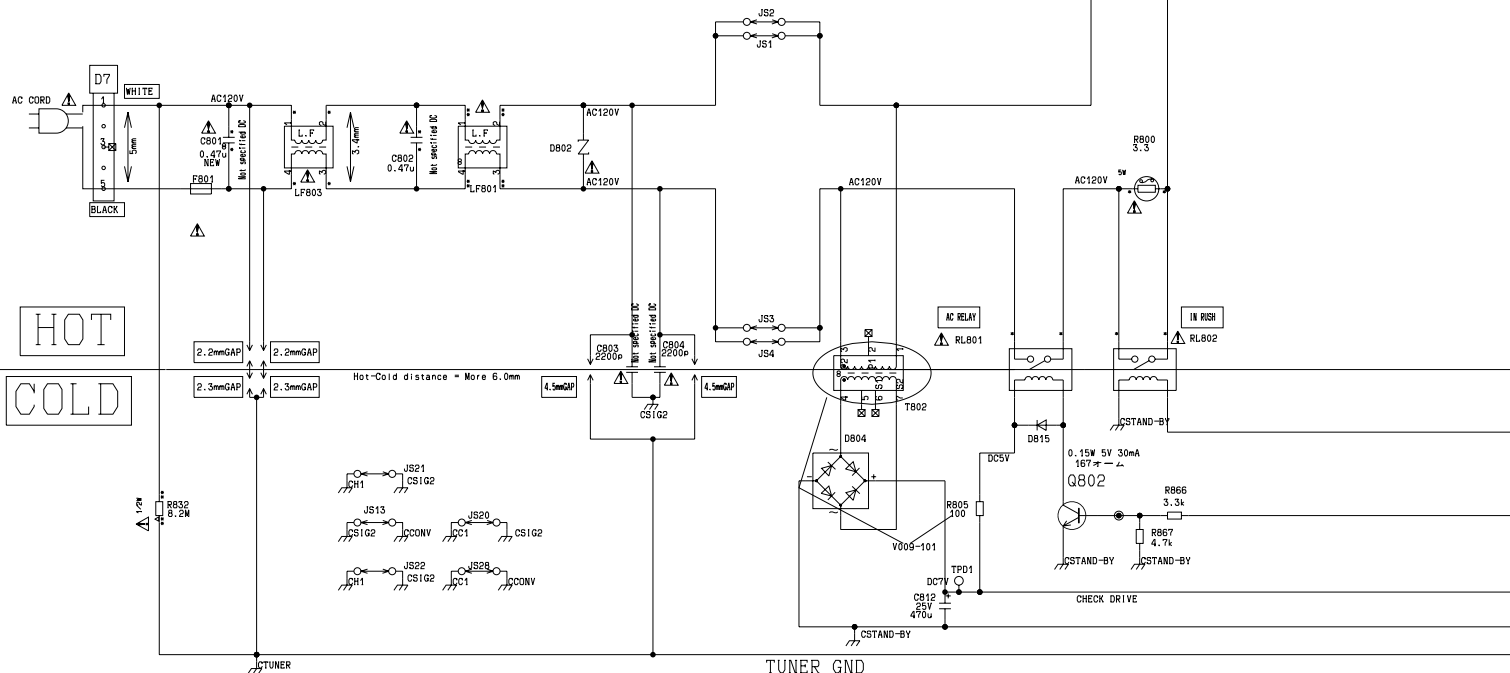




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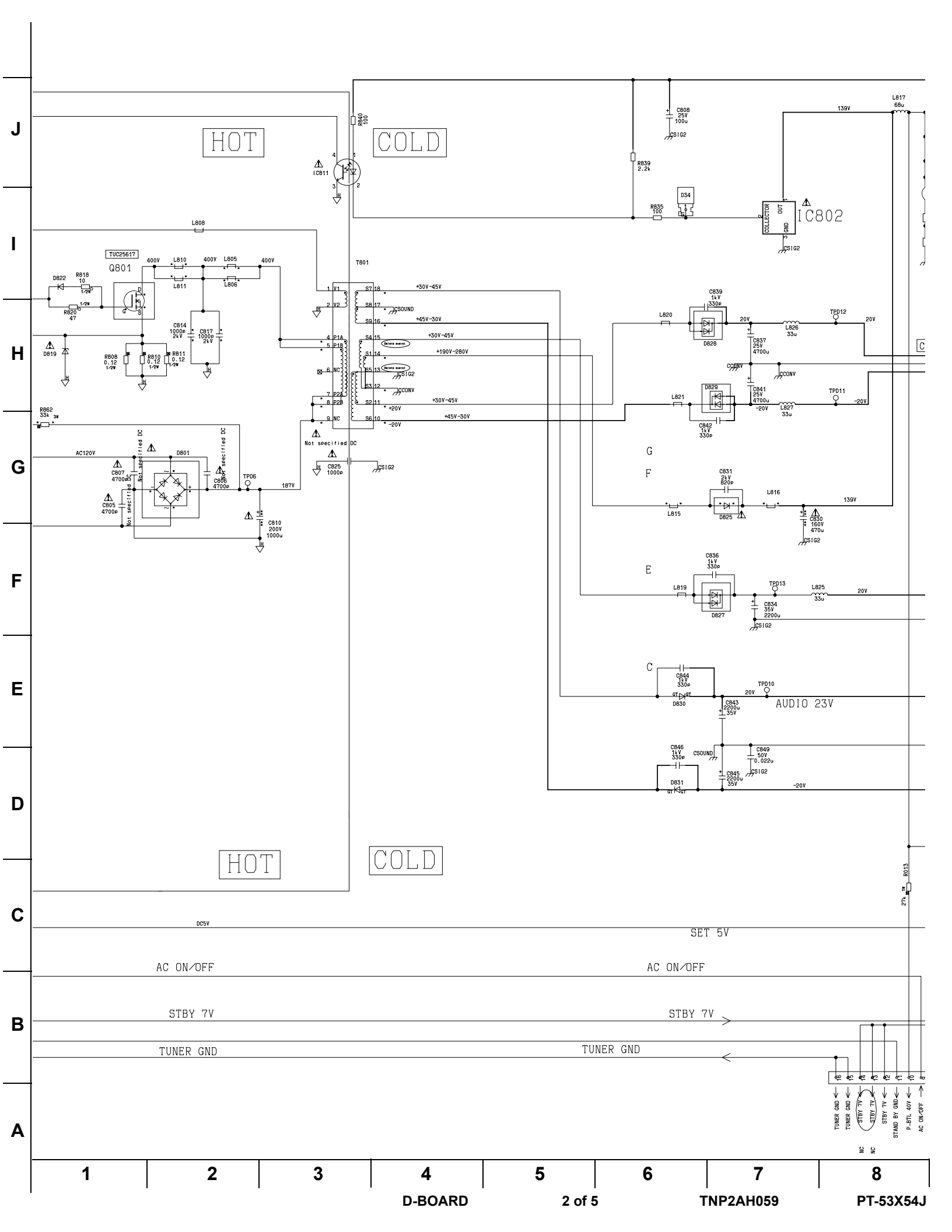
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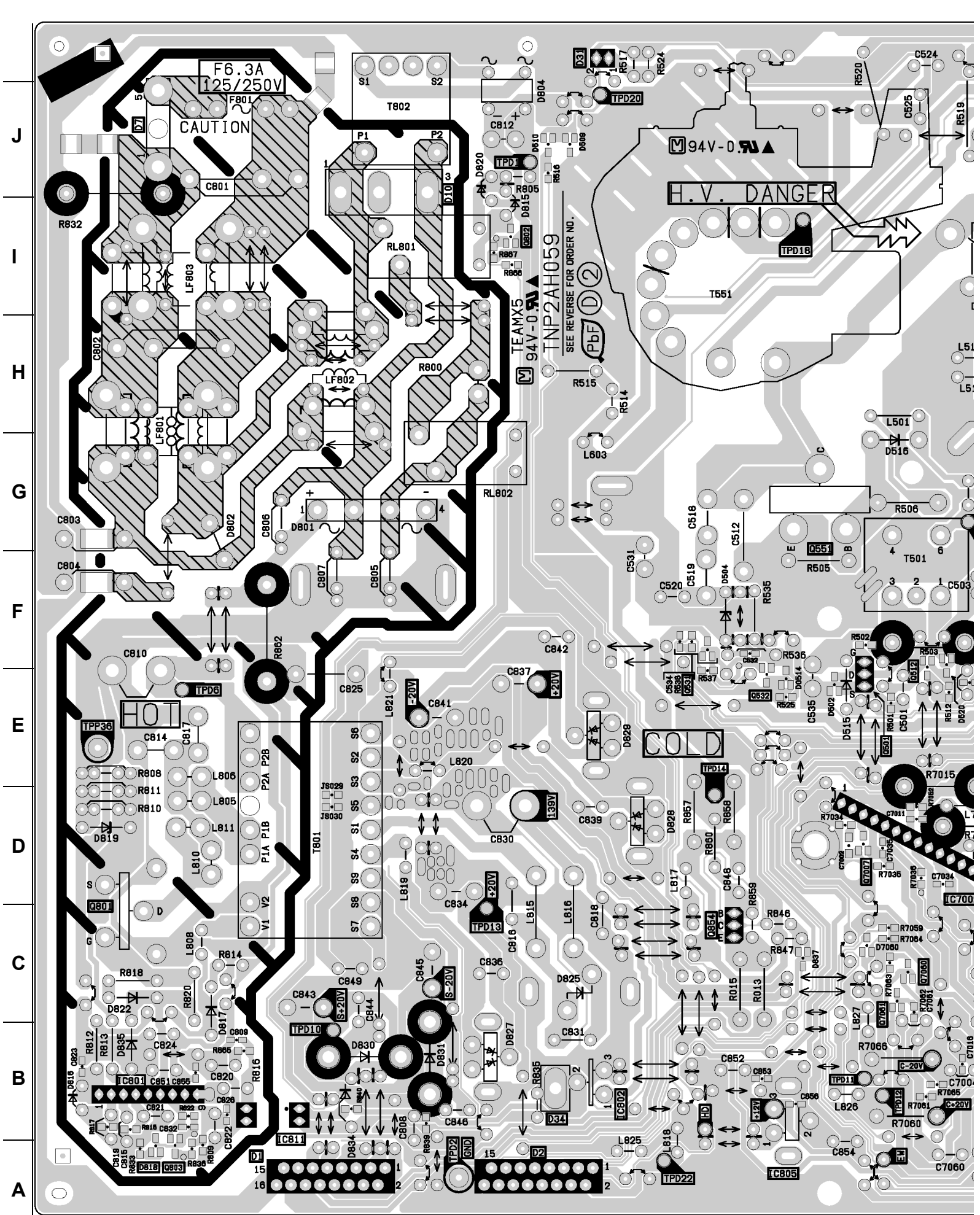
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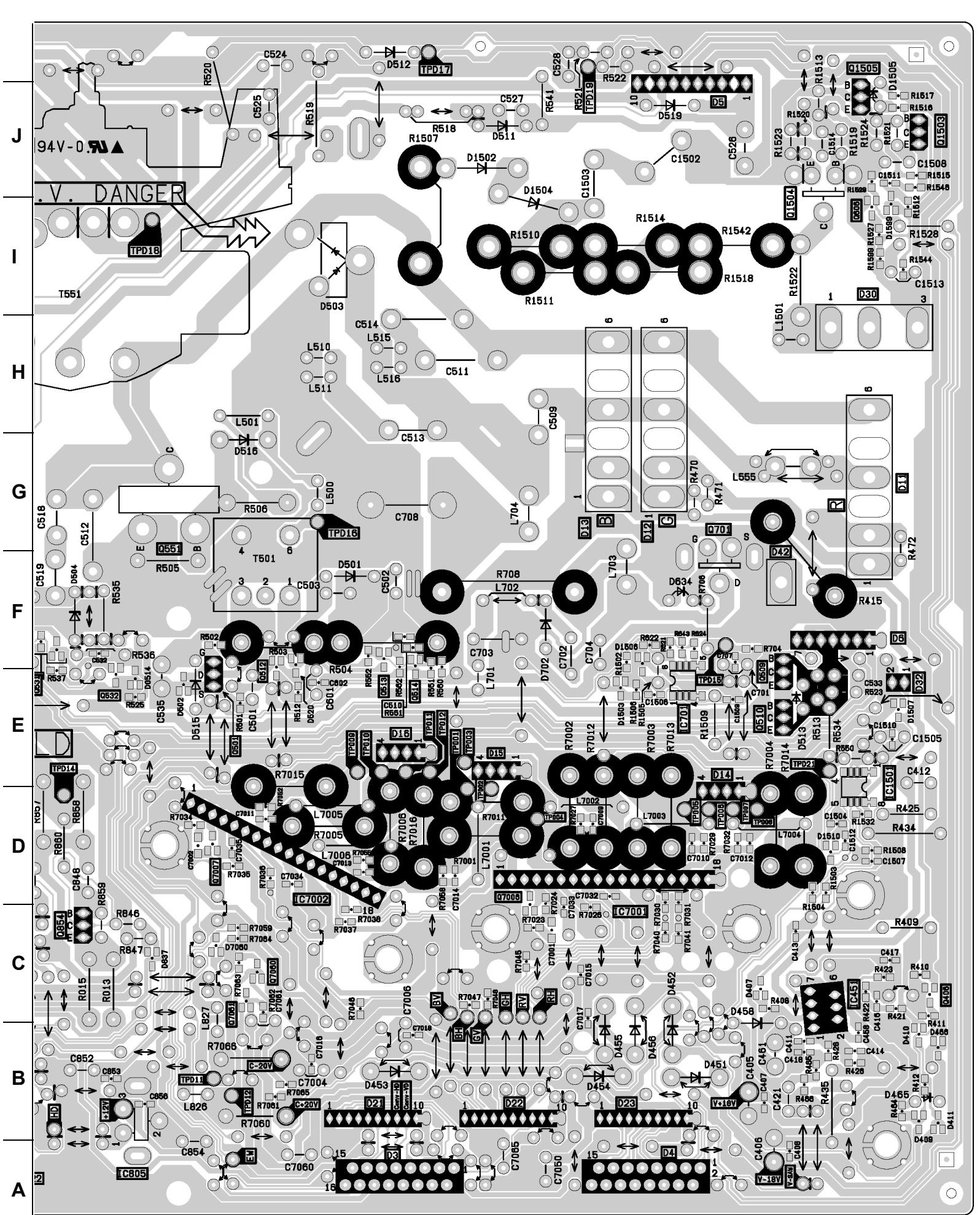
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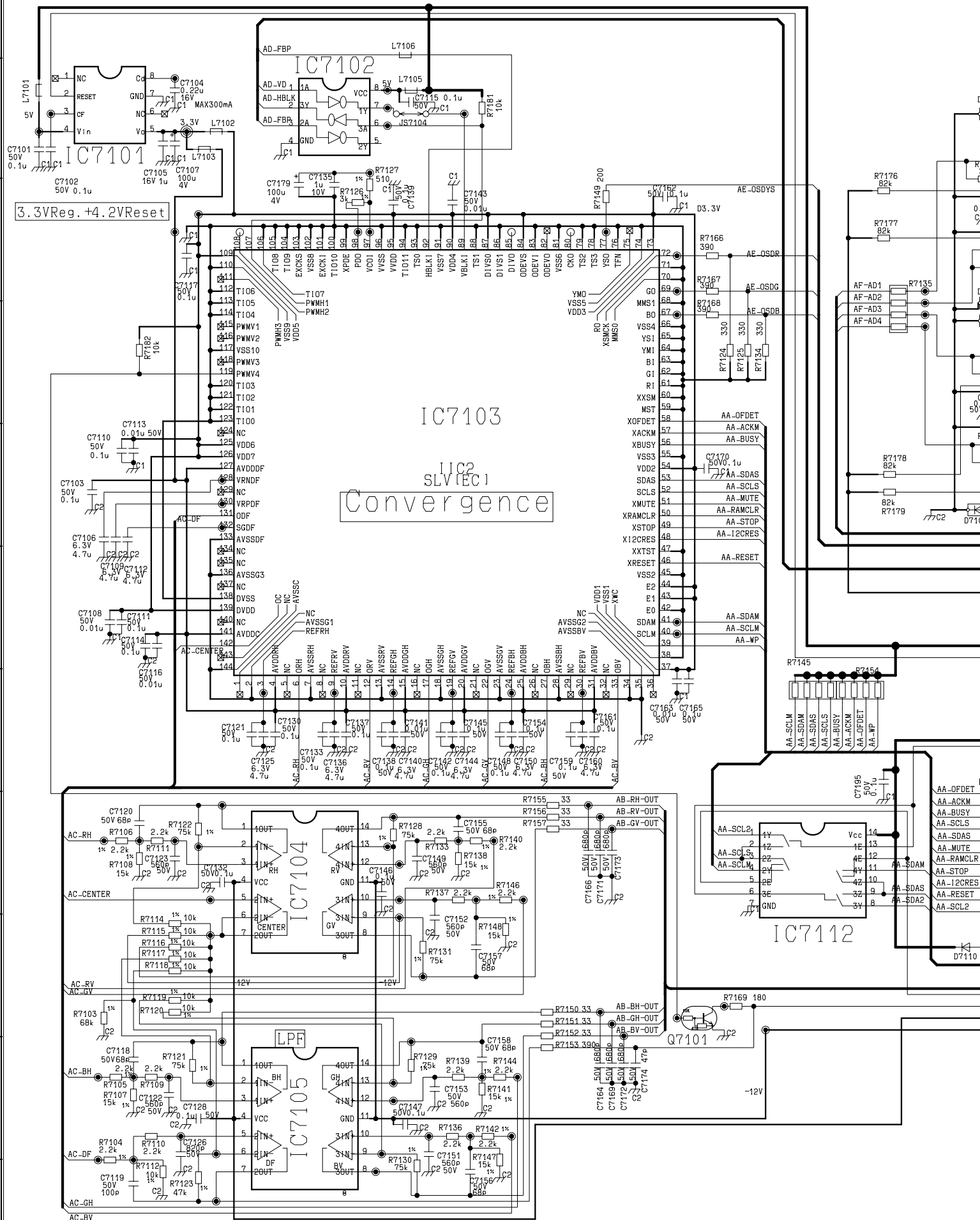
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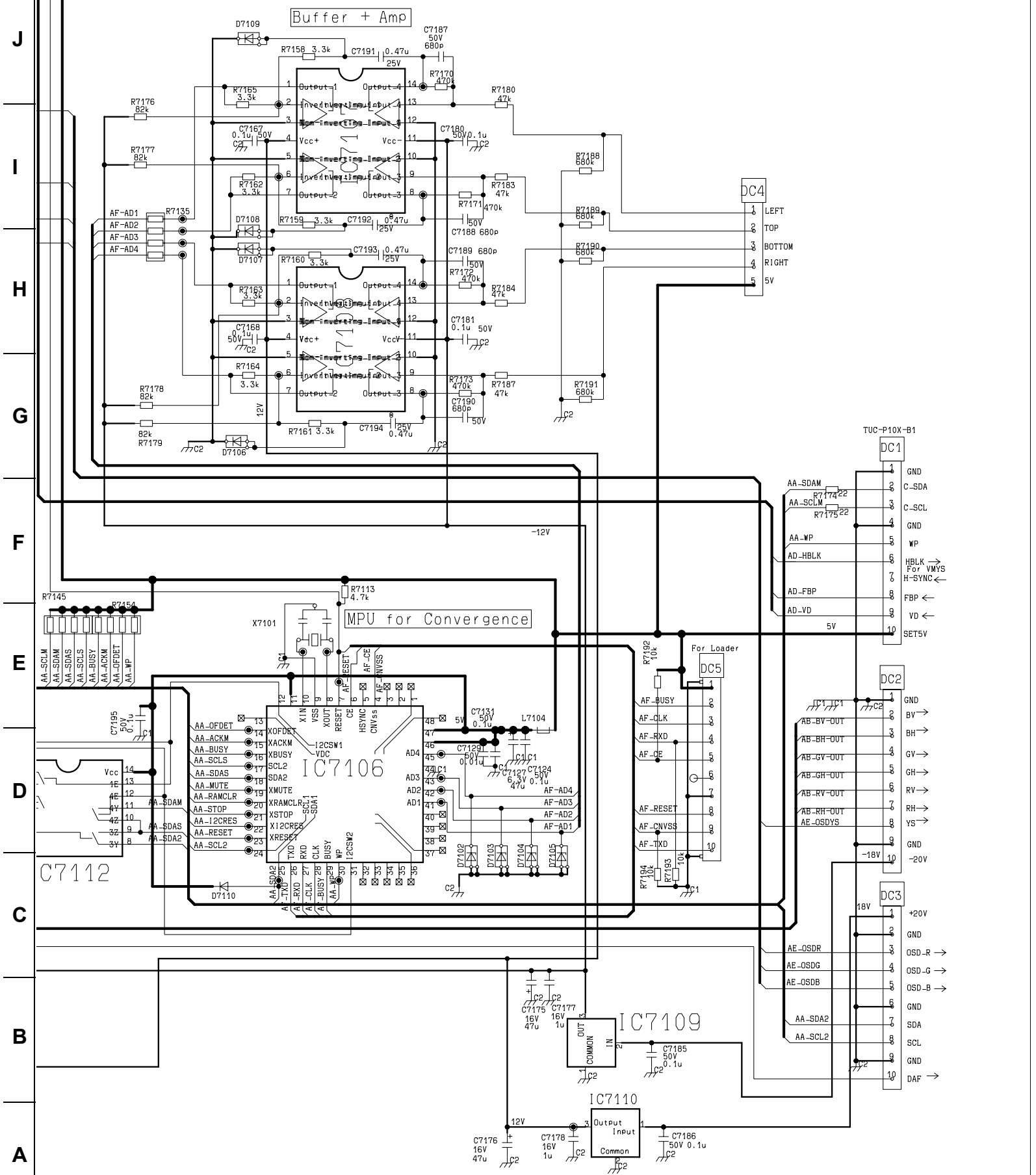
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TNP2AA163 (DC)



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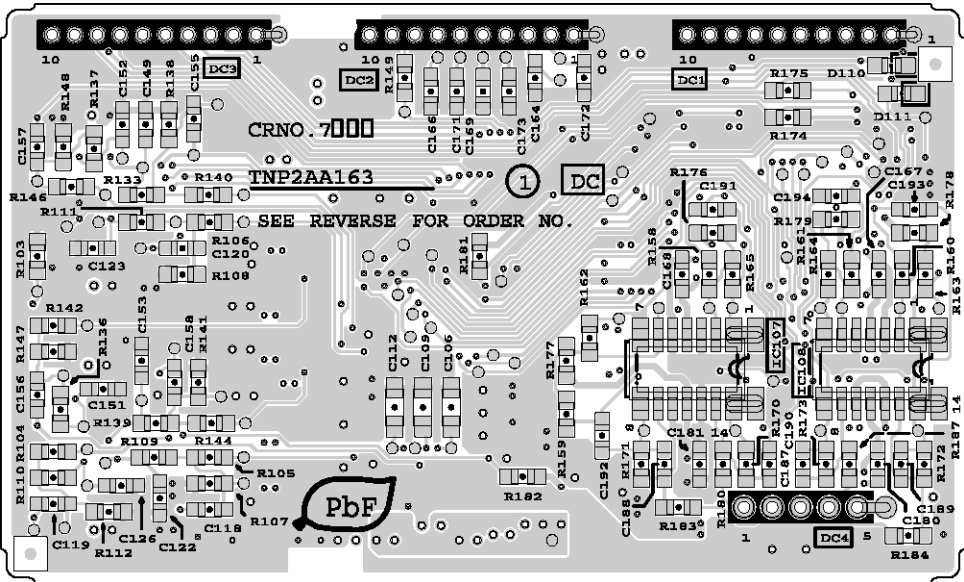
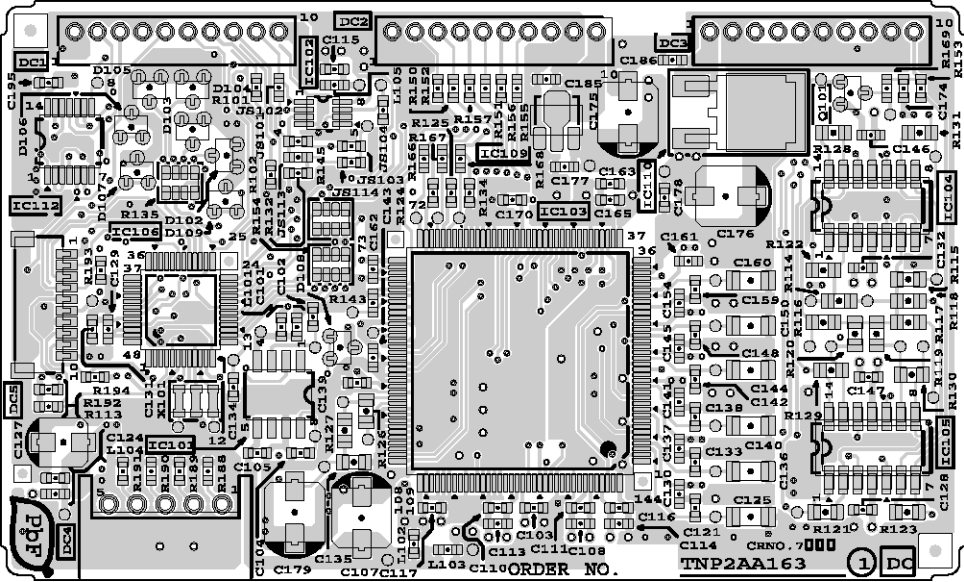
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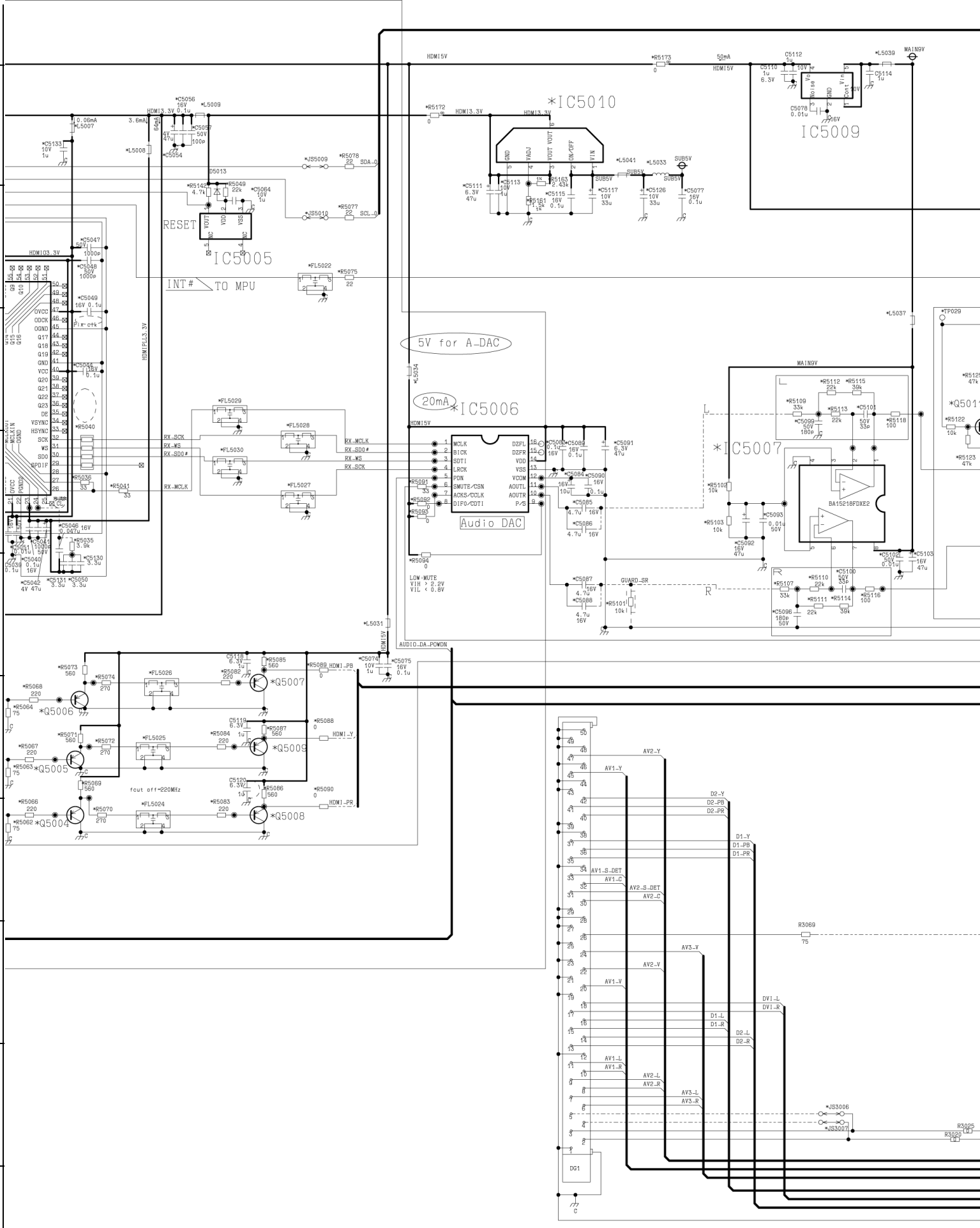
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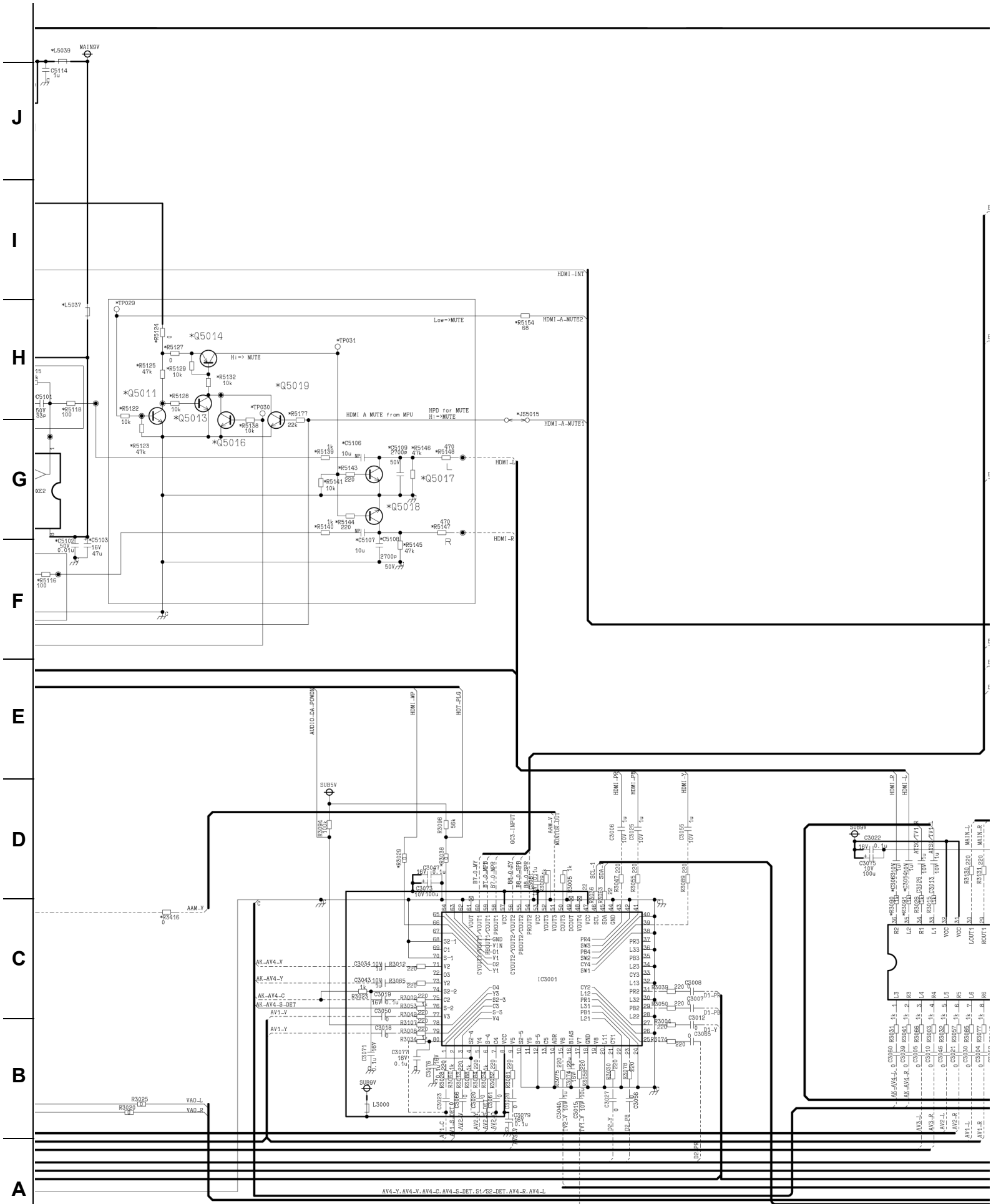
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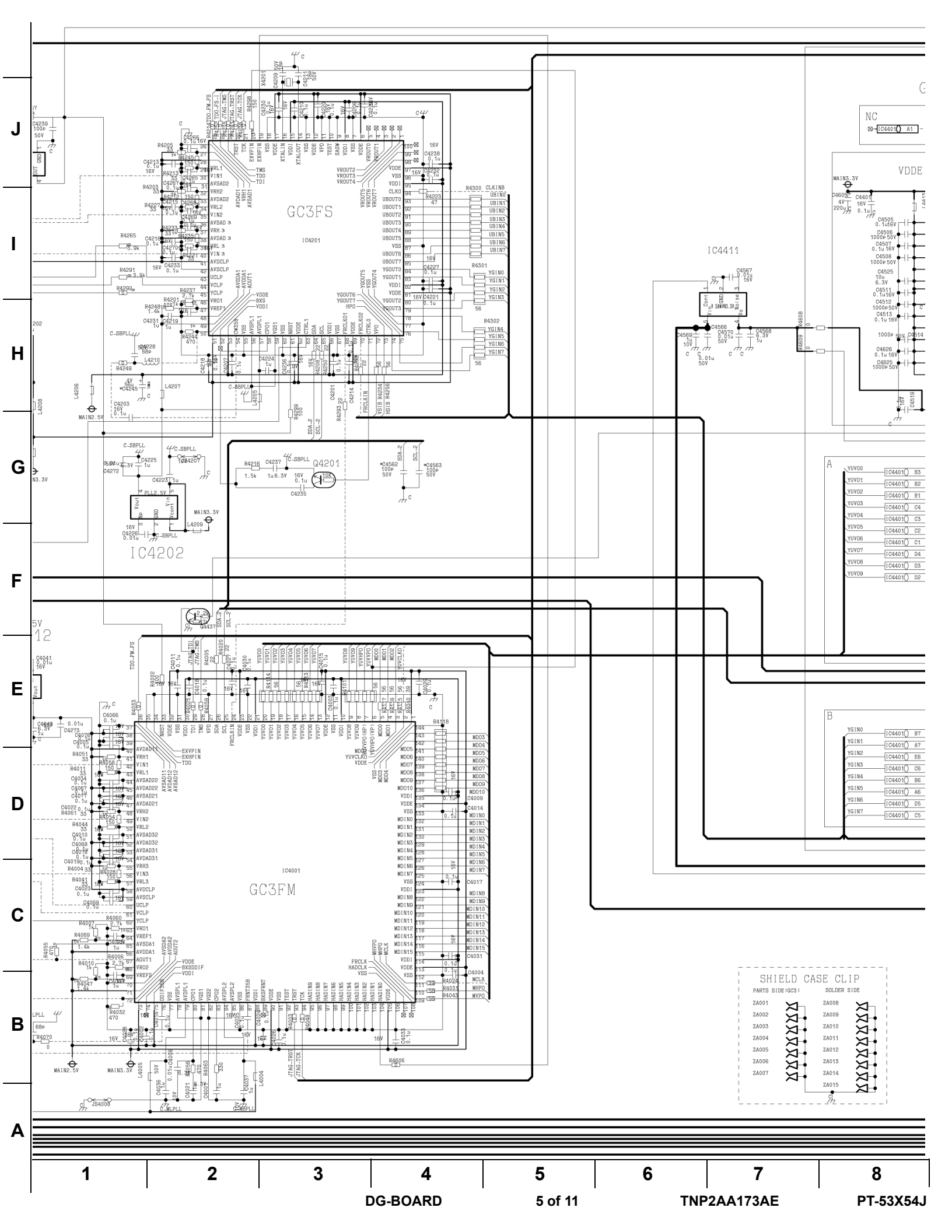
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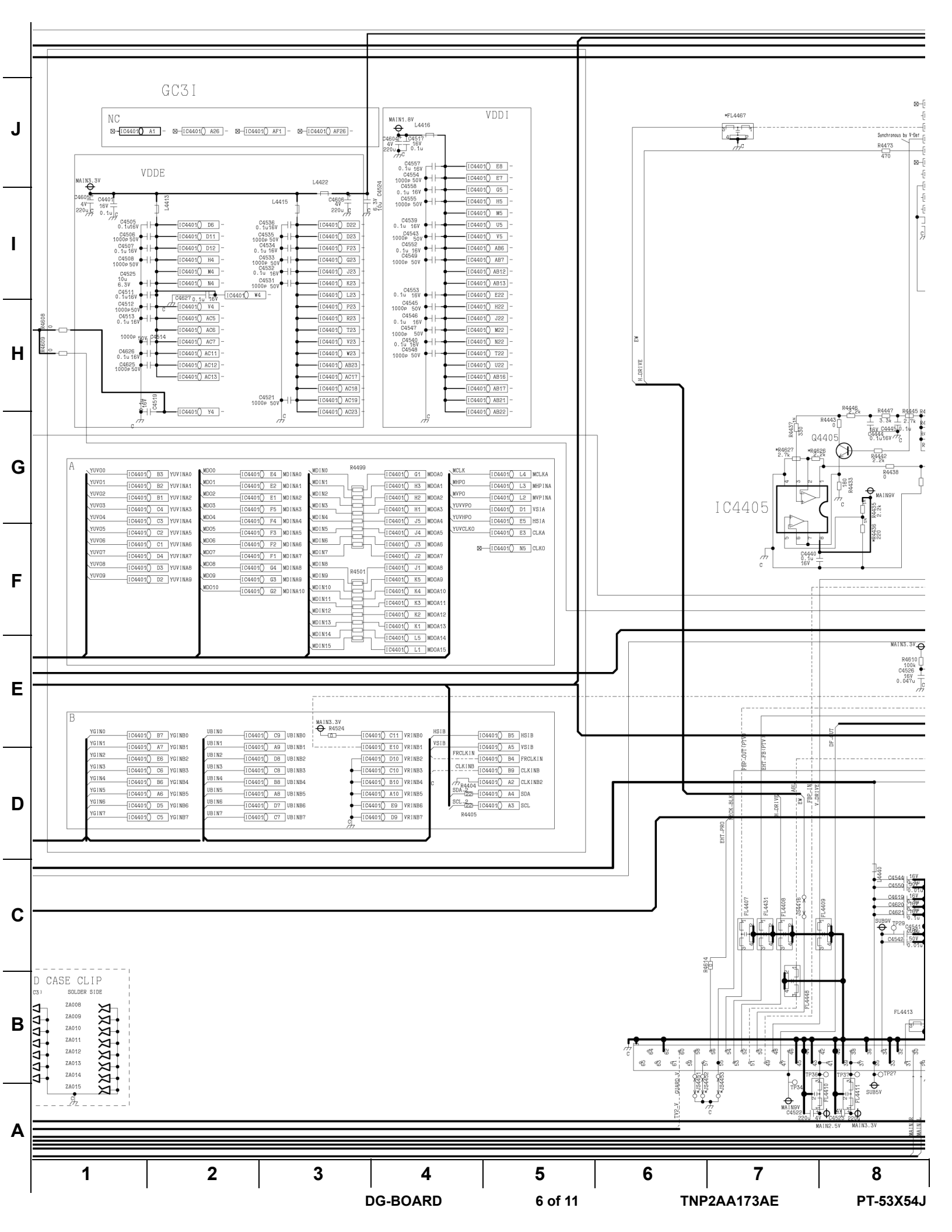


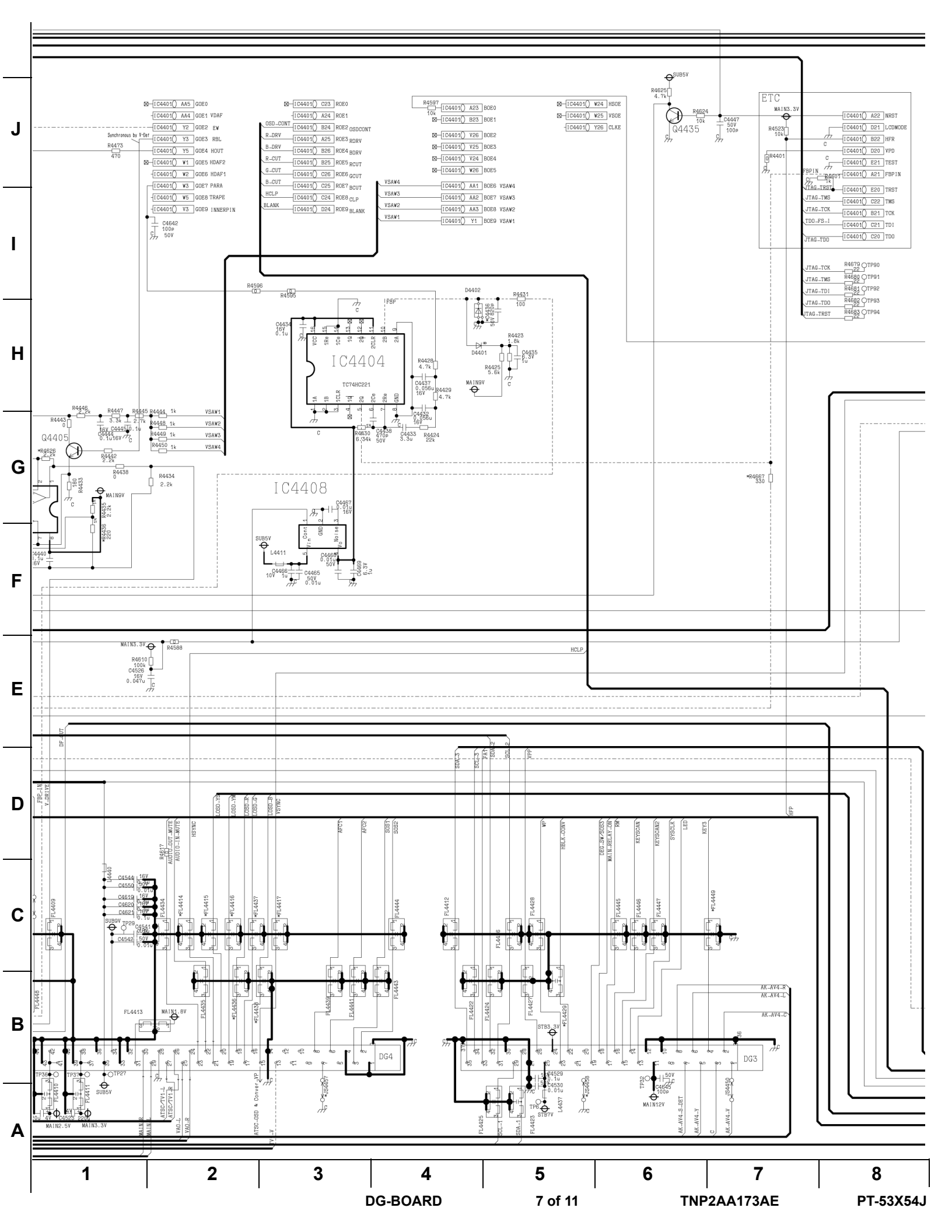
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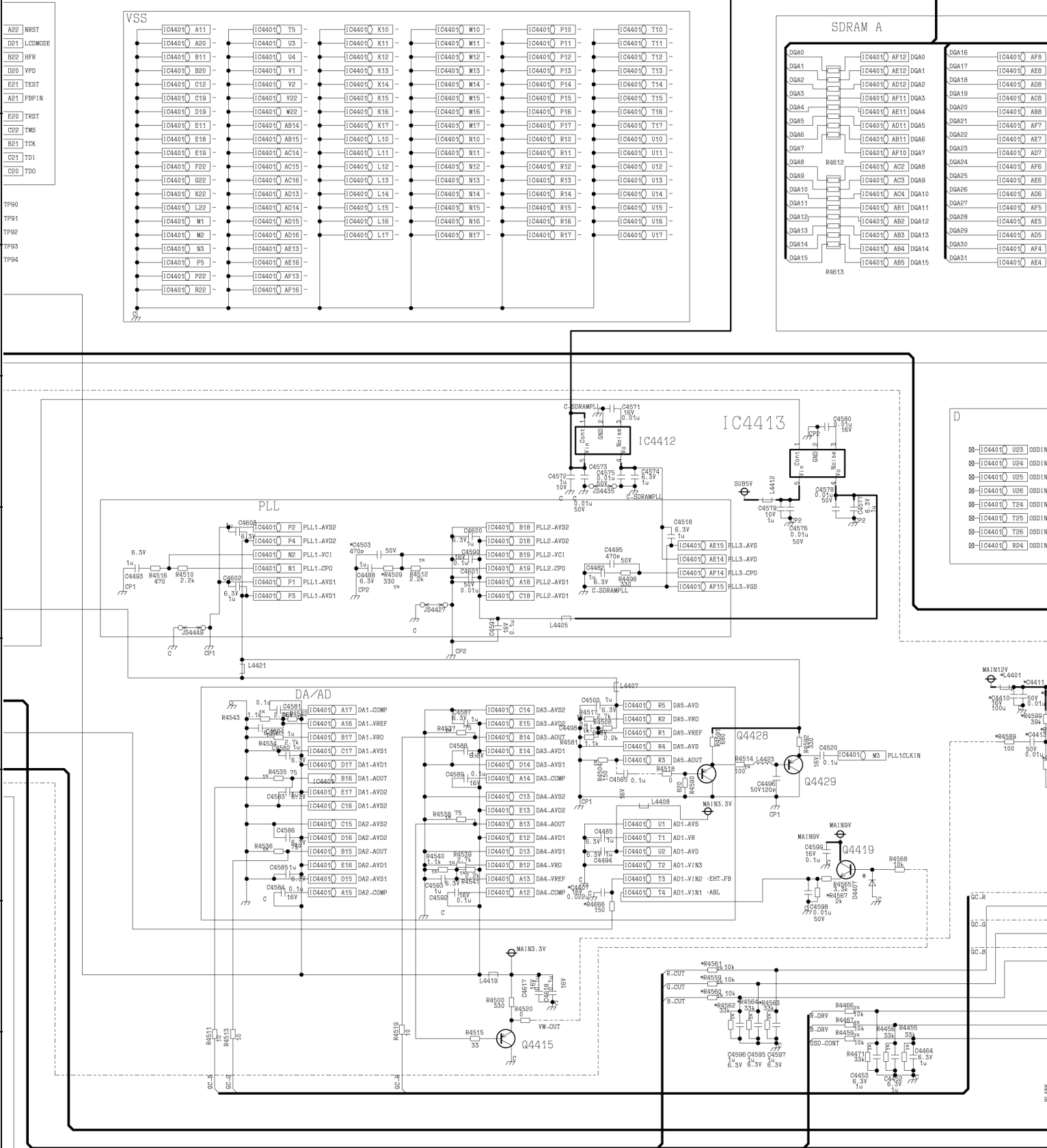


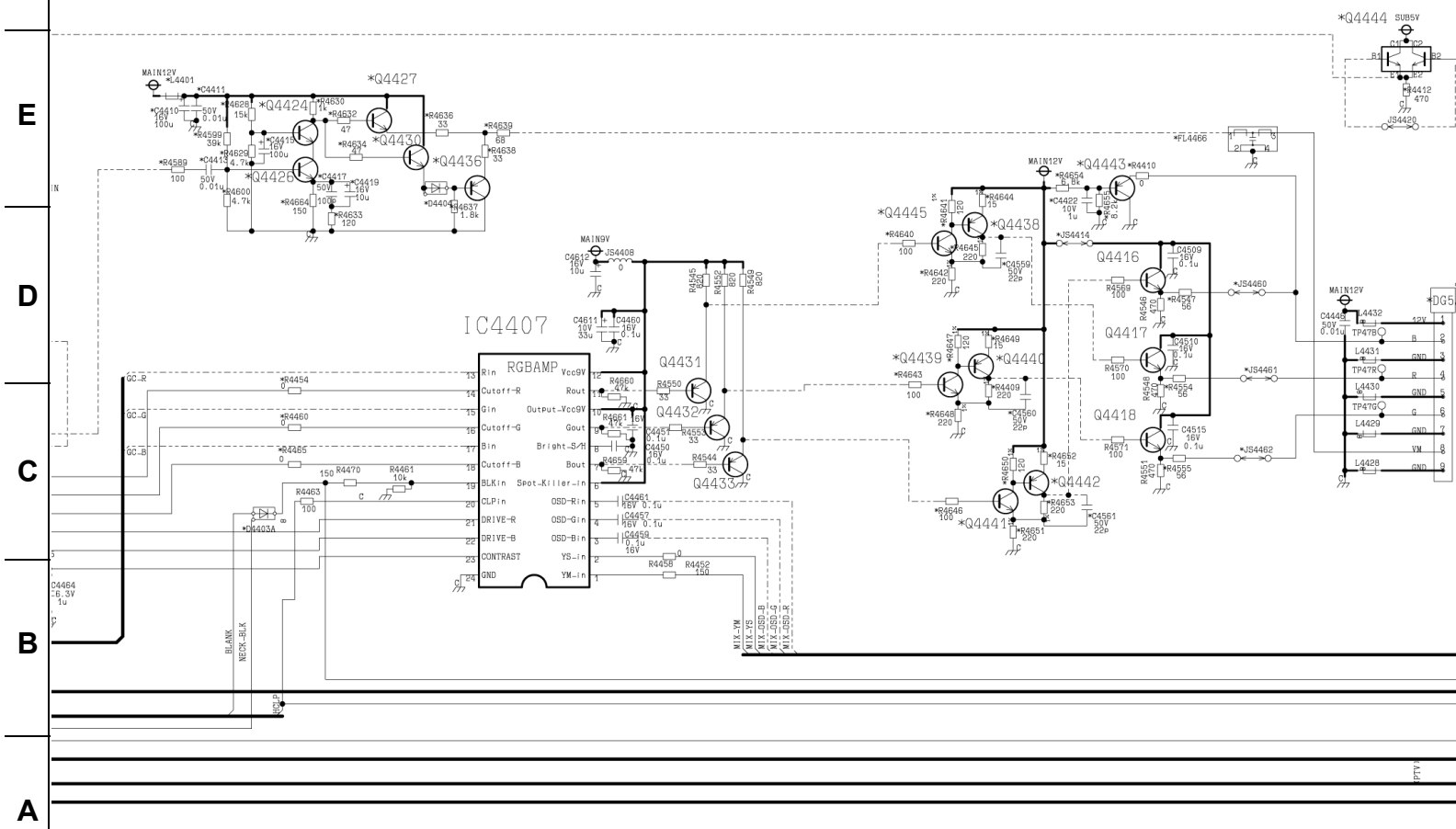
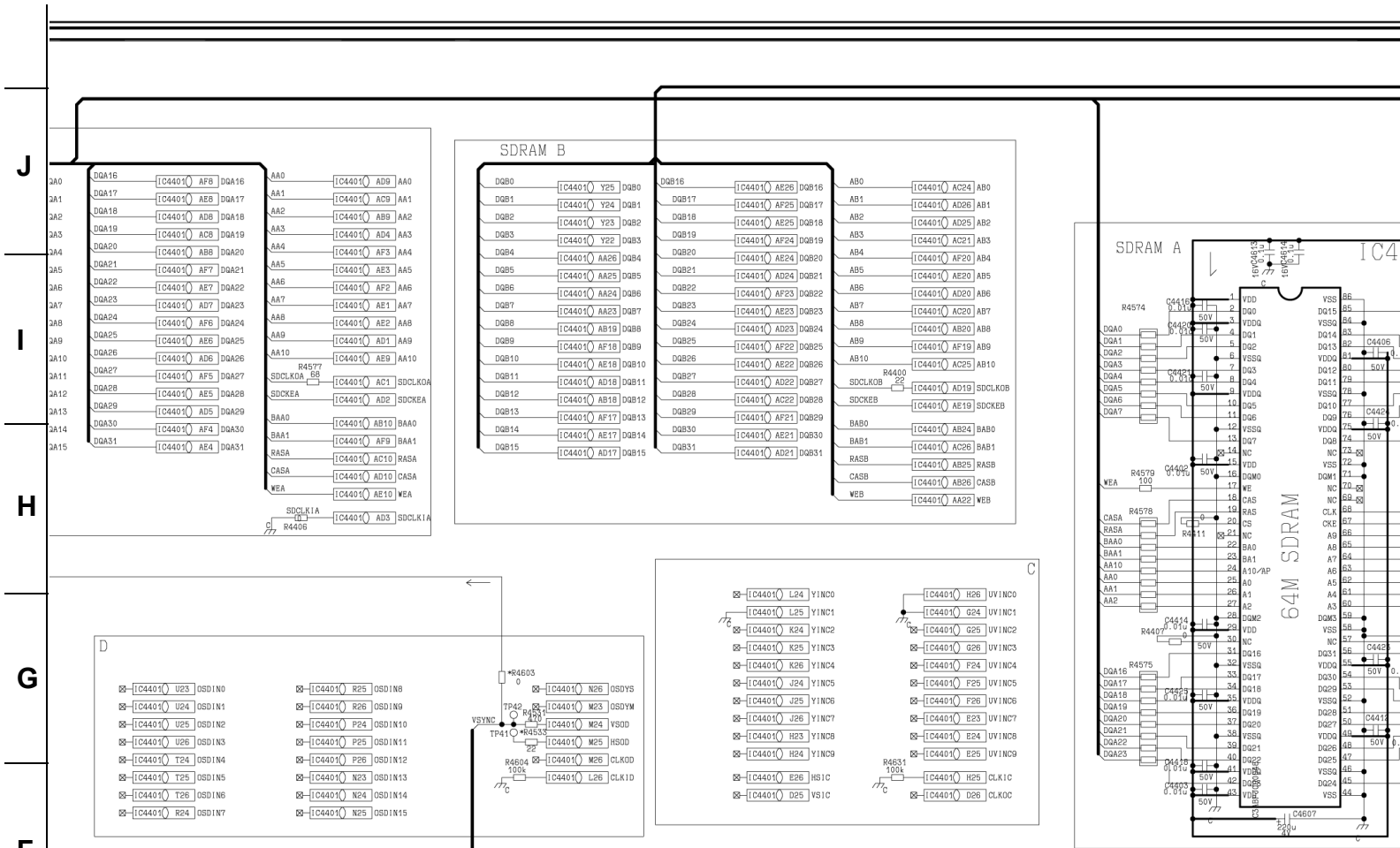




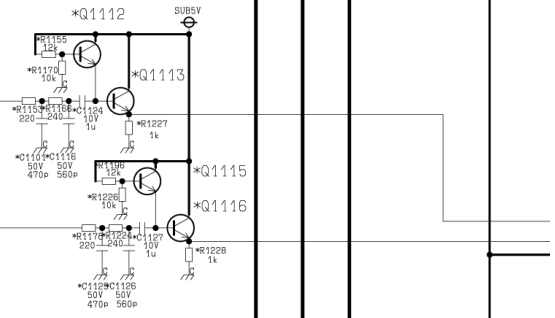
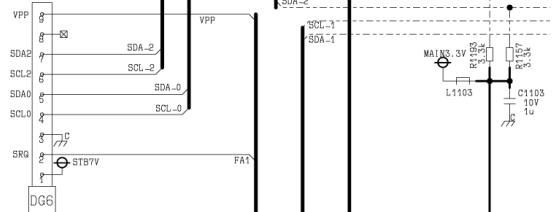
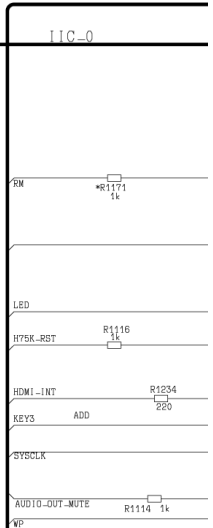
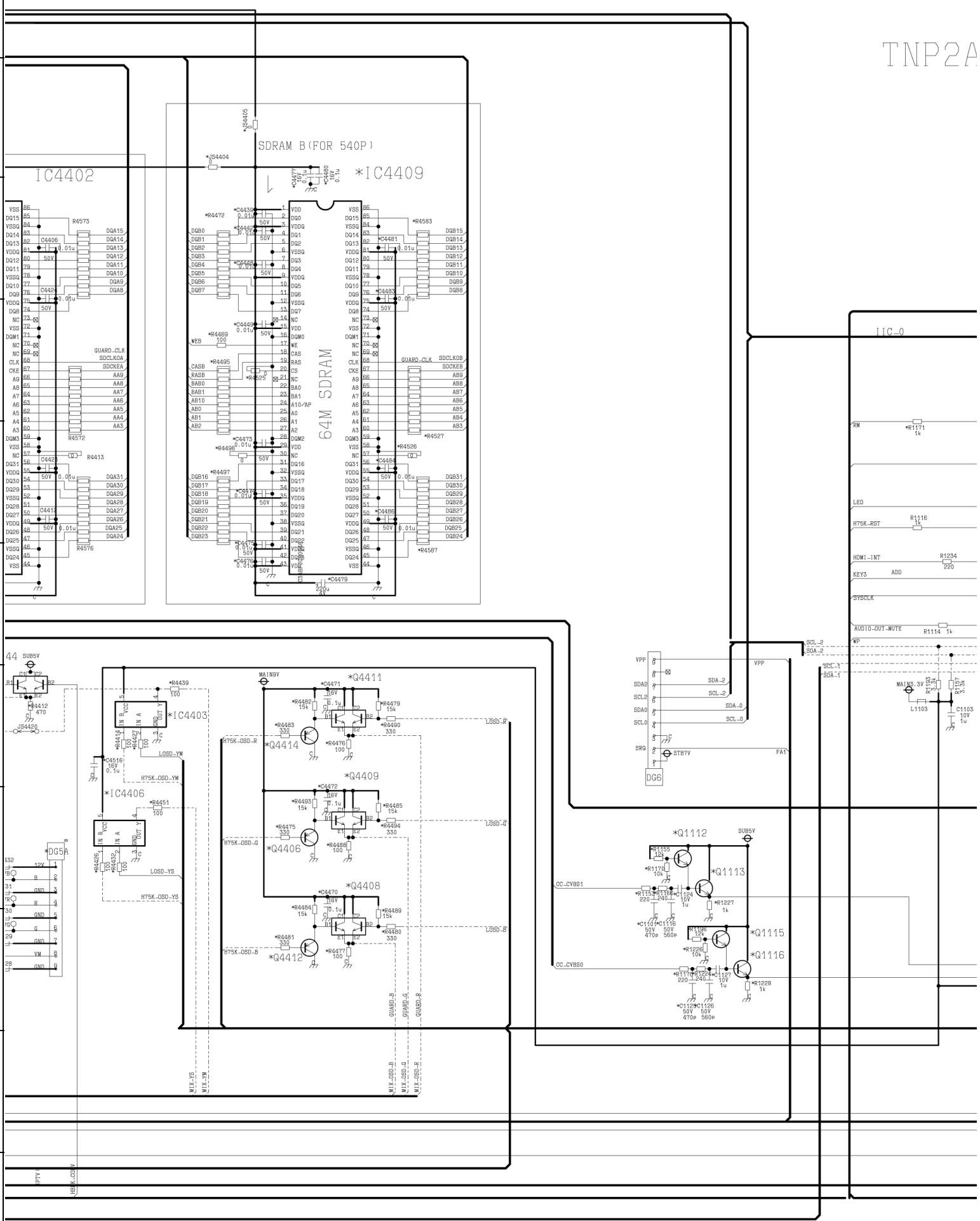


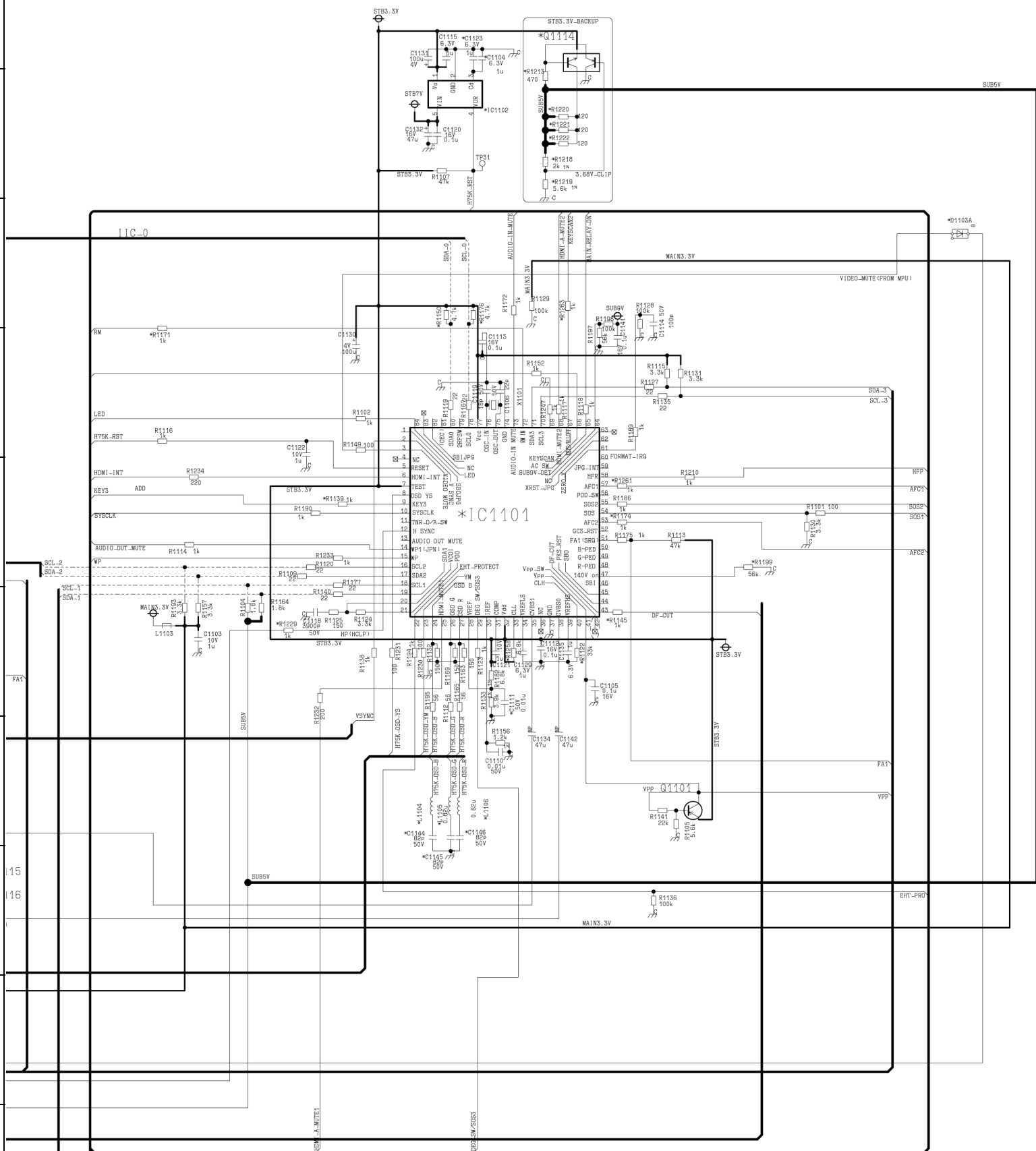
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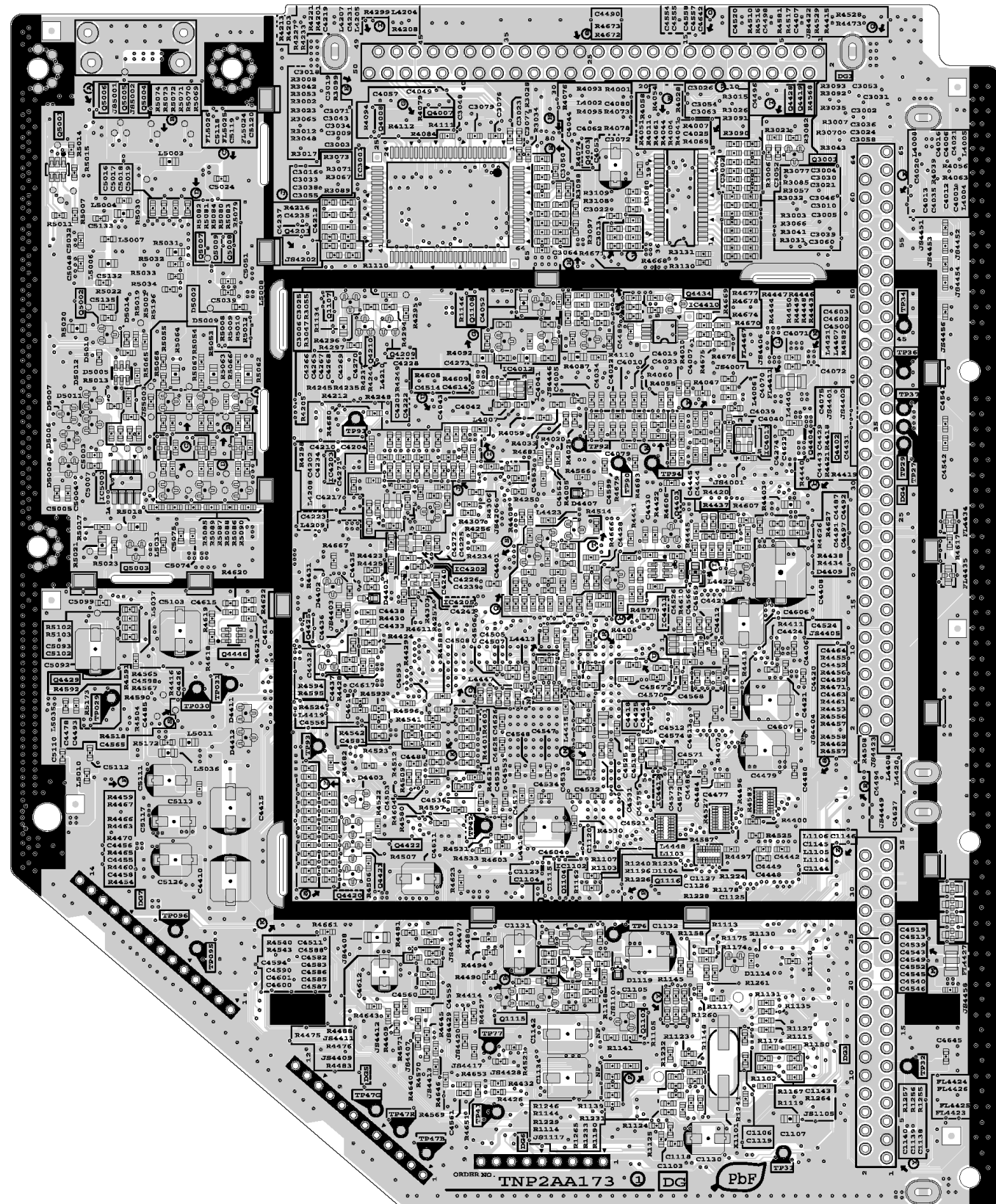


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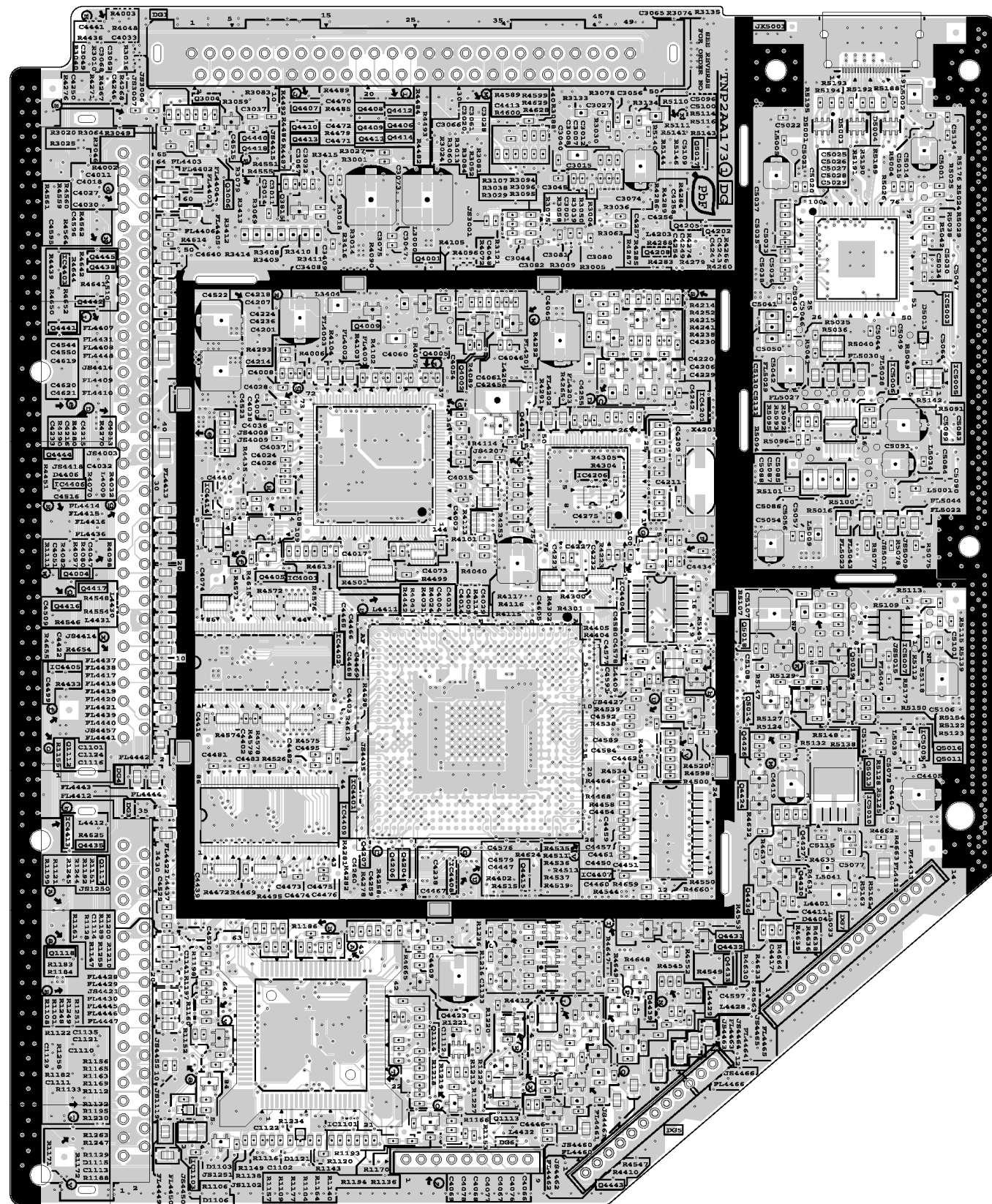
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DG-PCB BOTTOM VIEW

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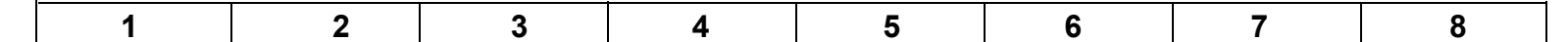
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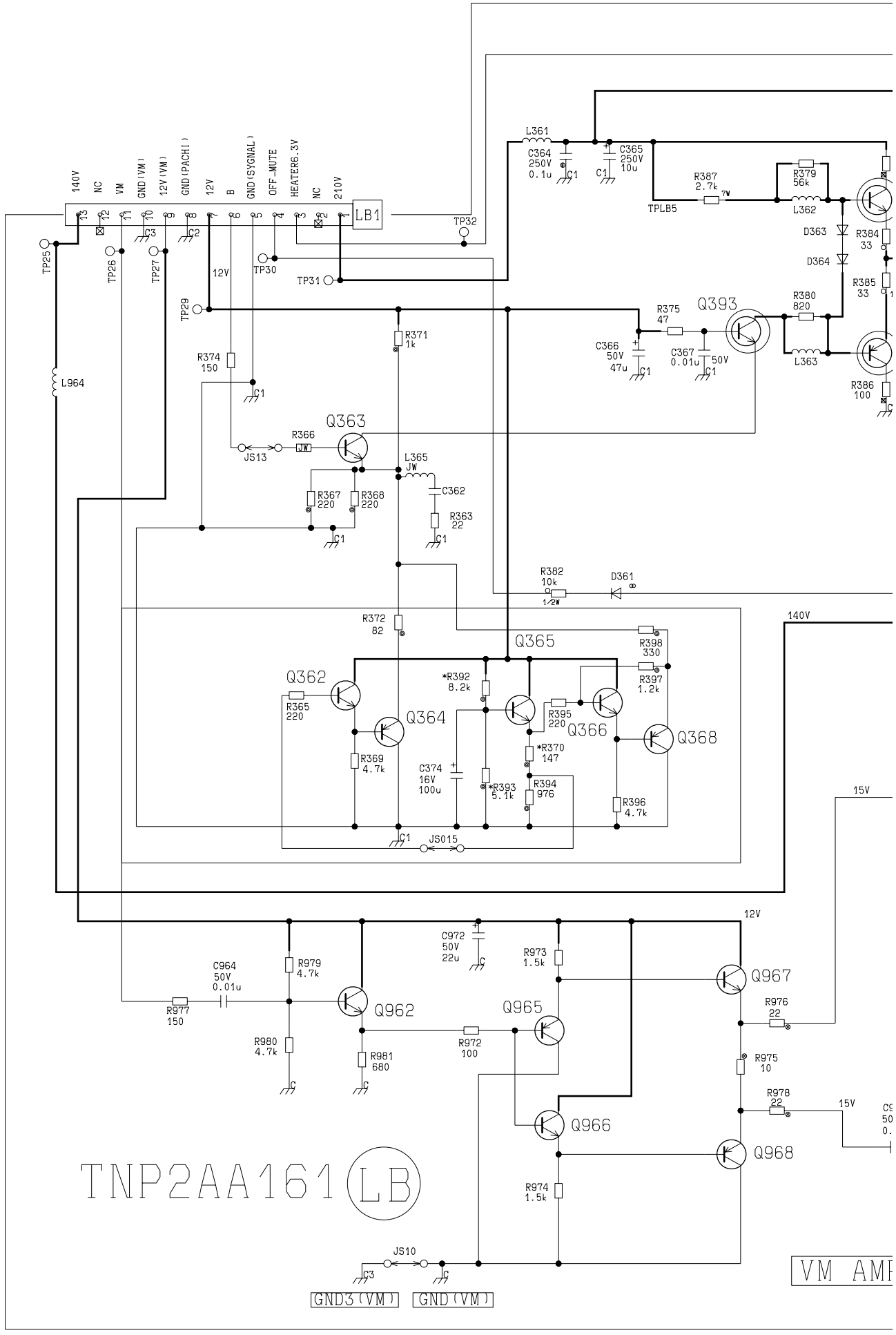
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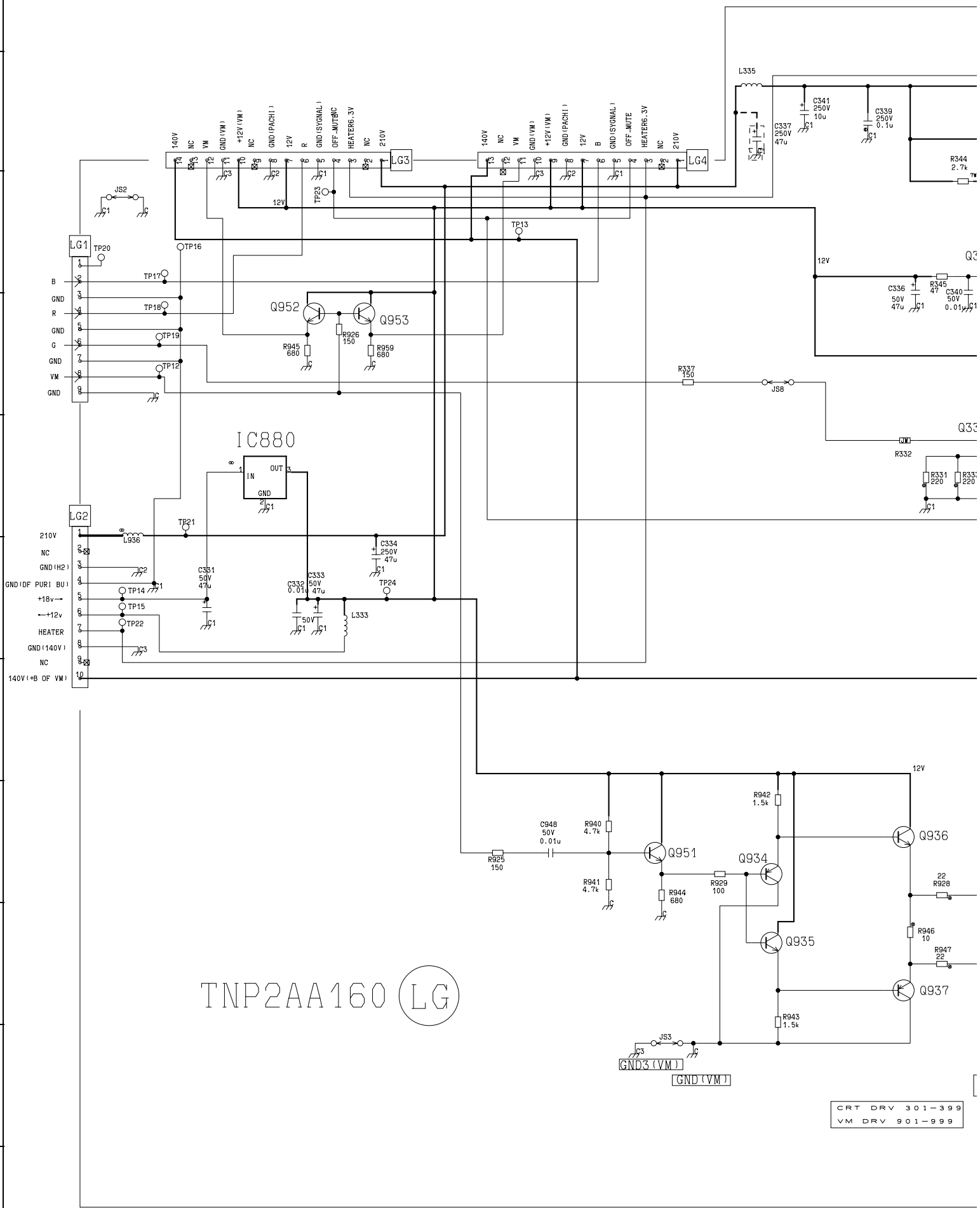
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CRT DRV 301-399
VM DRV 901-999